



(image: Guillaume Kurkdjian 'Vectrex')

**I don't think anyone has
been electrocuted yet...**

**Sharing info online to modify
an old games console for
vector oscillographics.**

Andrew Duff / University of Sussex

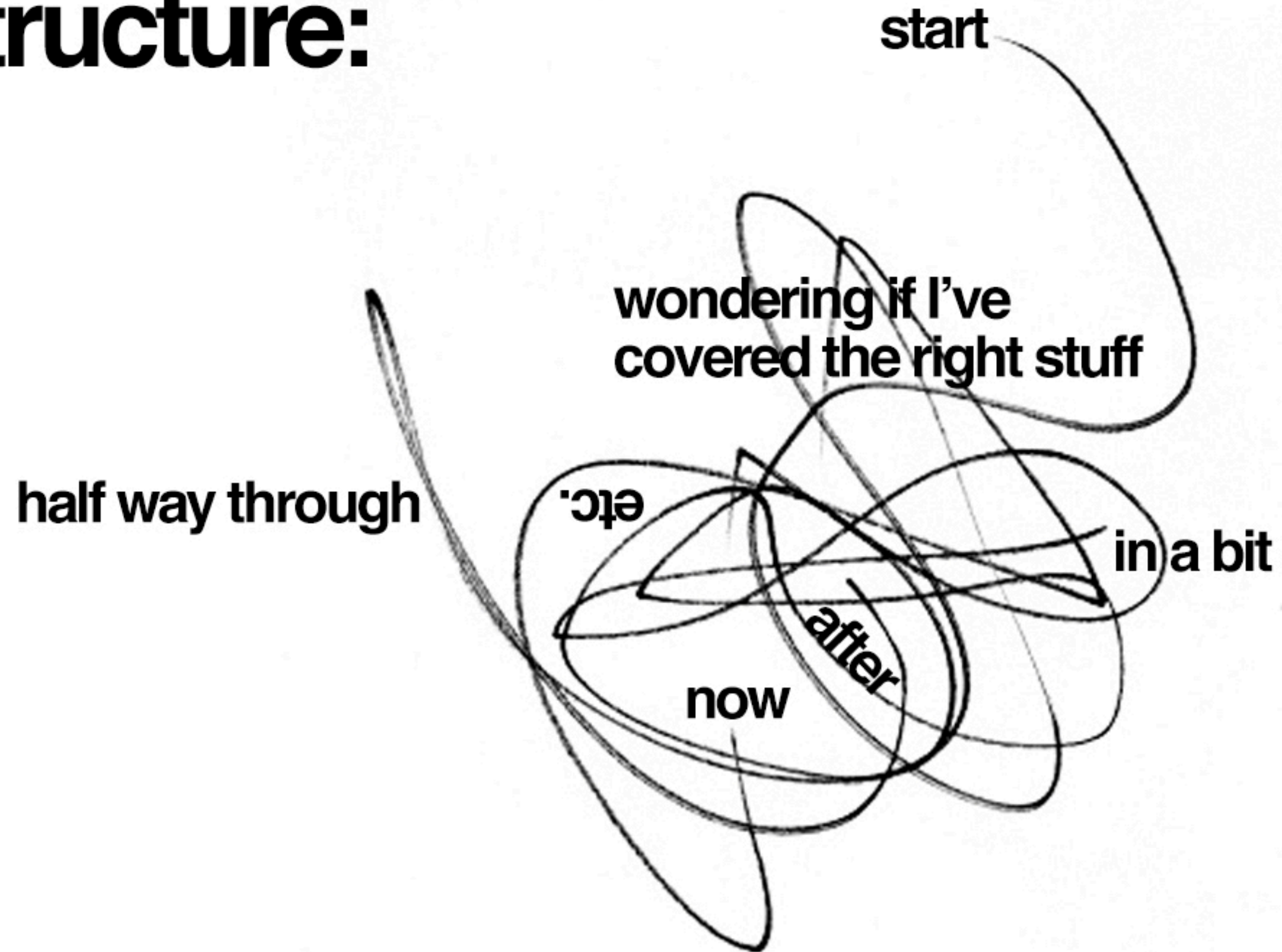
Turn an old TV into an Oscillograph For Oscillographics!



LOOK
MUM NO
COMPUTER



structure:



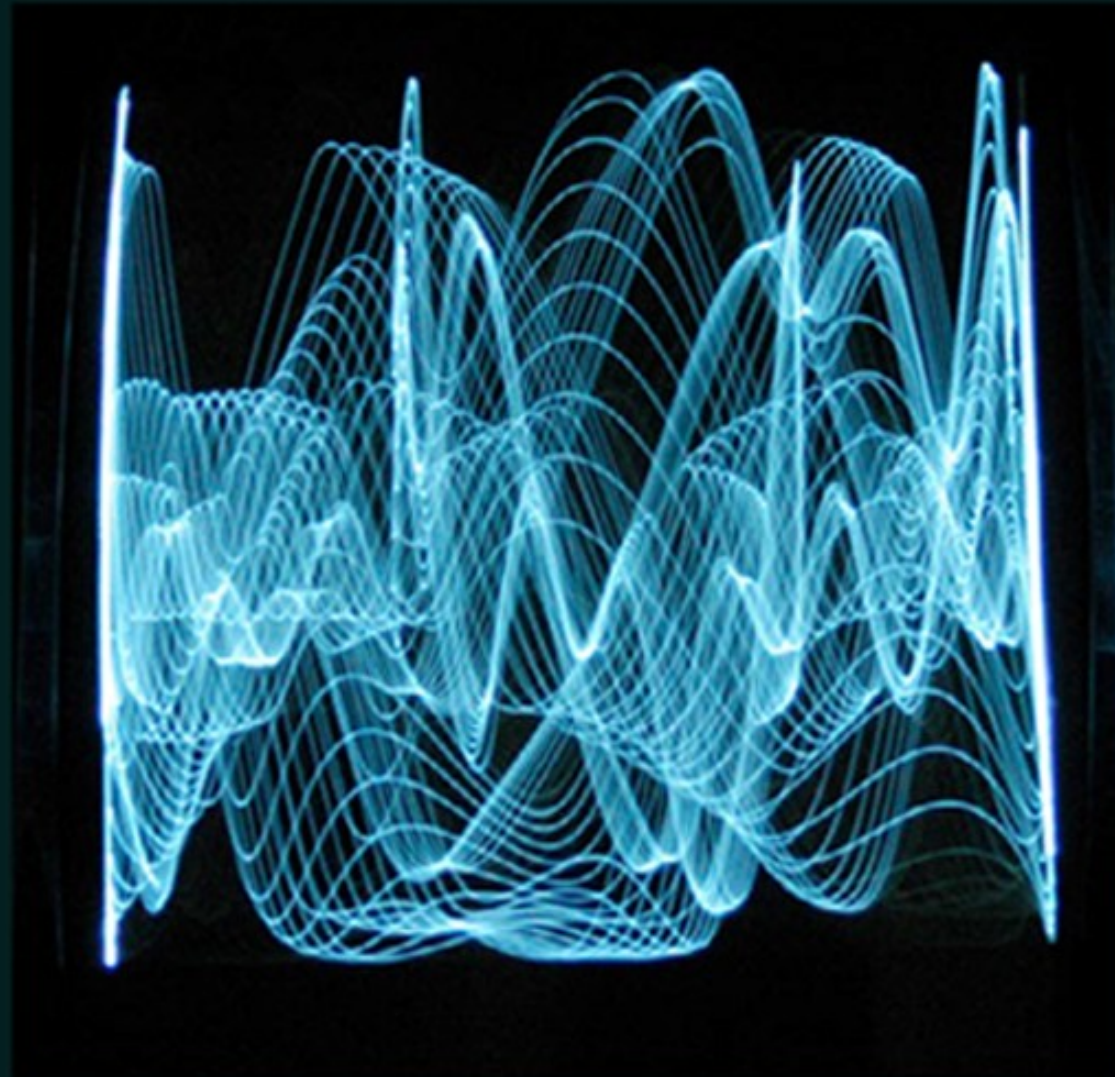
MB Games Vectrex 1982-1984

Unlike a normal old CRT that displays images via a grid of pixels, a vector screen shows its images by drawing lines between points. these screens can only really show lines but do not suffer from any aliasing or pixelation.



Vectrex

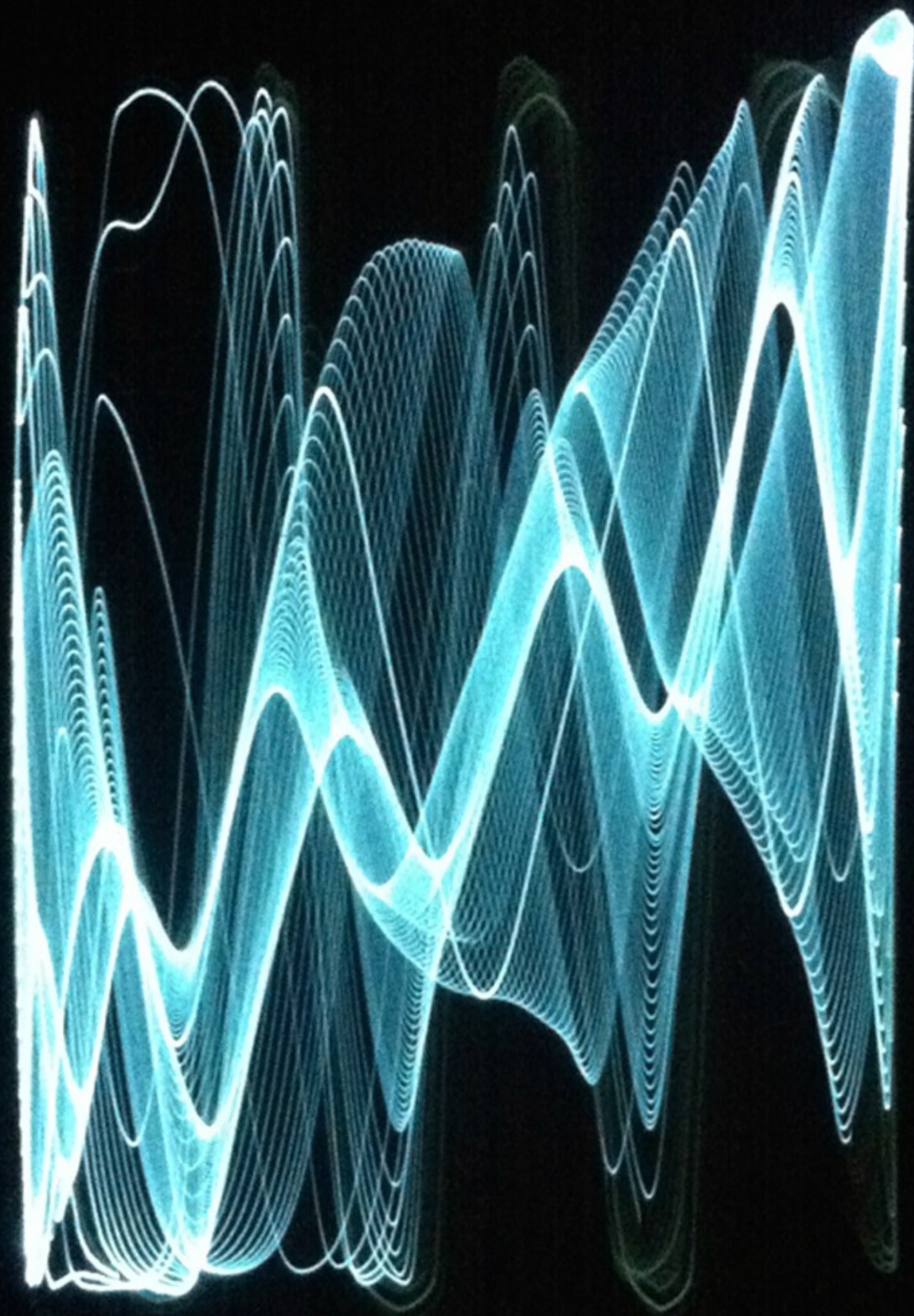
minijack-input mod

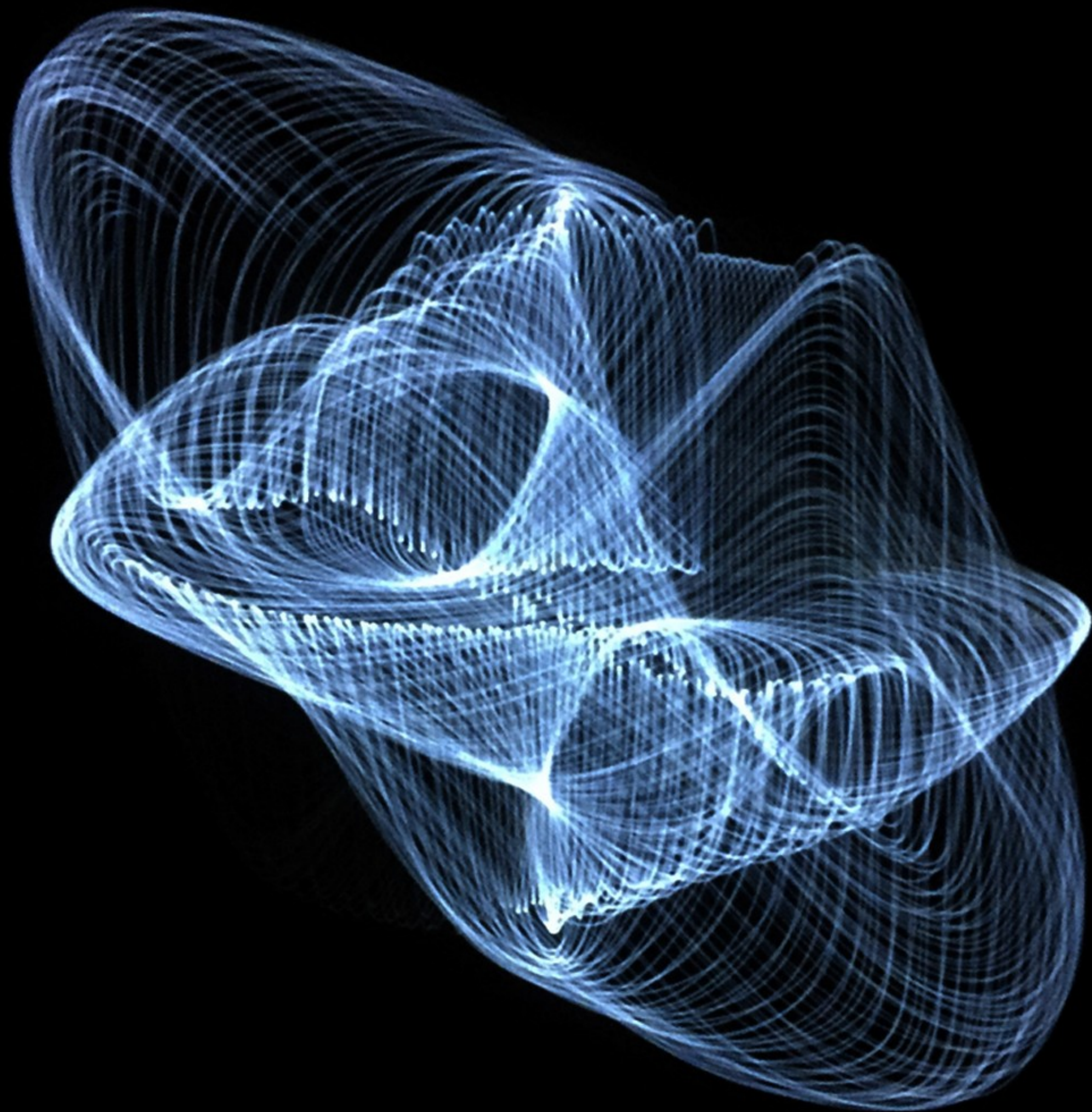


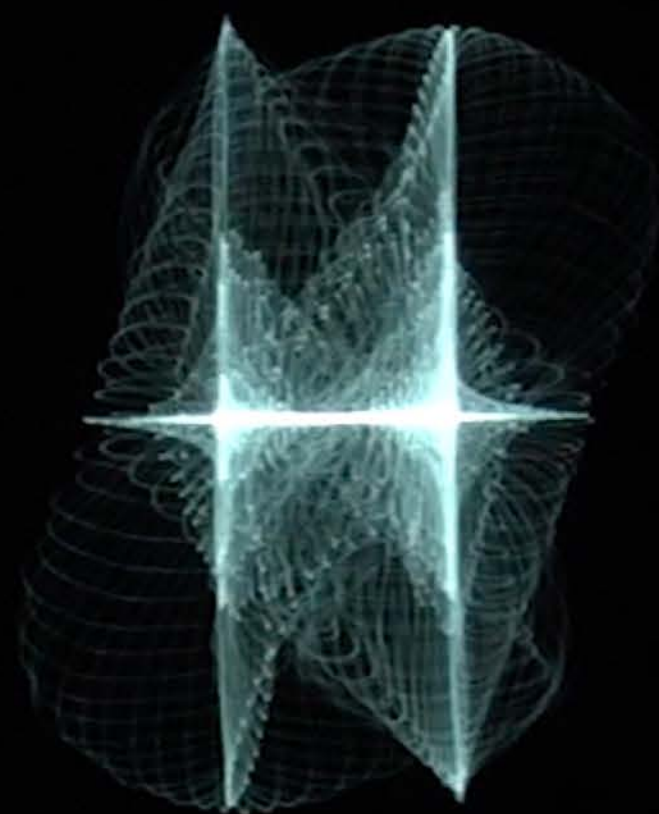
Disclaimer: I take no responsibility for any damage to the Vectrex or your own person, whilst performing this modification.

This unit can contain dangerous/heart-stopping amounts of electricity.

BEFORE EMBARKING ON THIS MODIFICATION, ENSURE THE VECTREX UNIT IS DISCONNECTED FROM ANY POWER SOURCE!





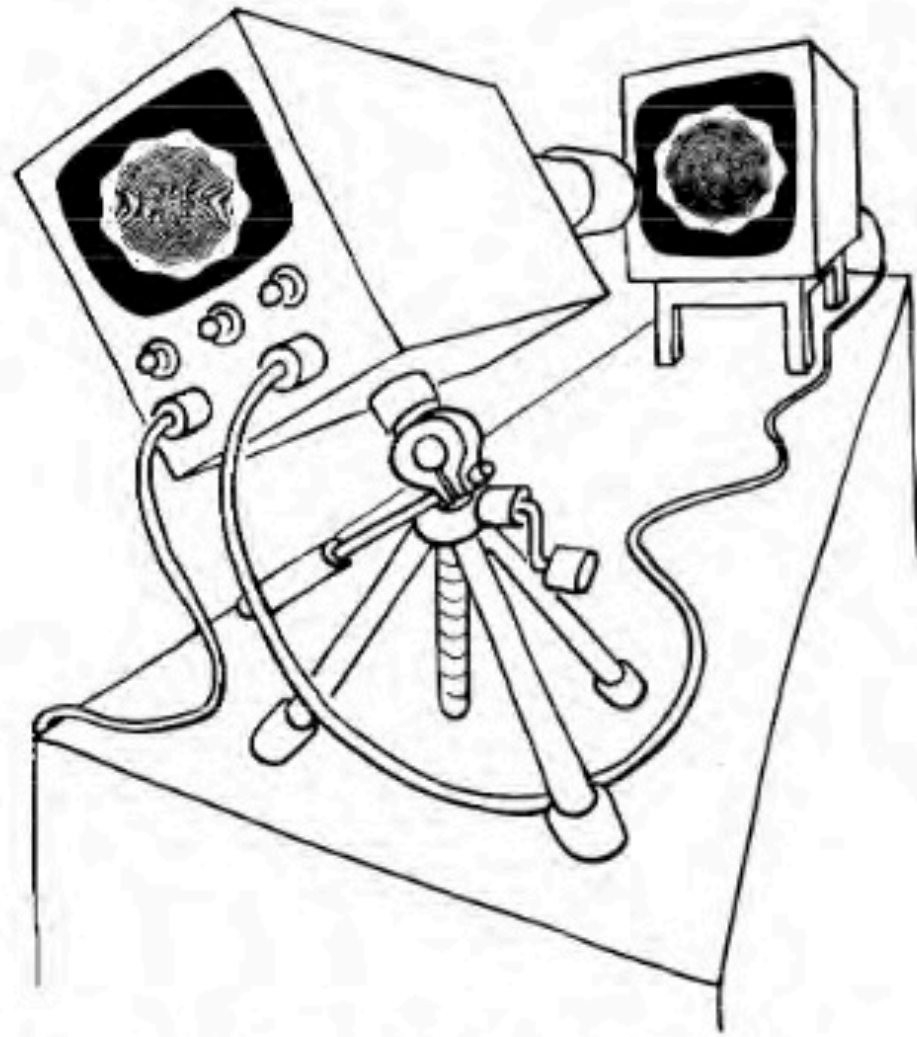


Who/What/Why/How/Where/When?

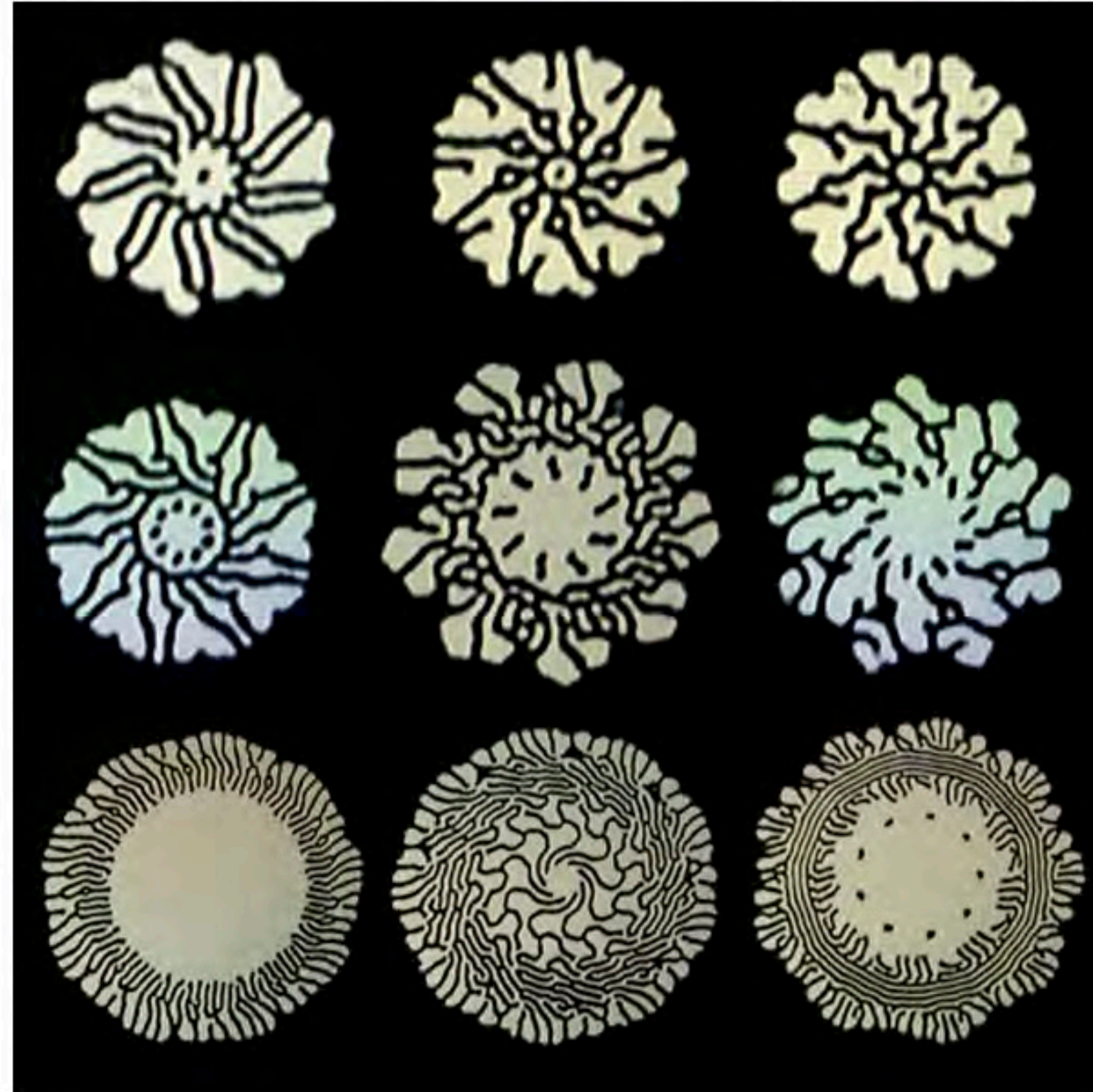
- Studied fine art & video art [early 90s] with old consumer video gear.**
- DJ'd & made beepy techno [mid 90s] on old Roland gear.**
- Studied Design & Digital Media & built an audio/visualiser in MAX (pre-Jitter) [early 2000s].**
- Teaching (at Sussex) & running the Brighton Modular Meet [now].**

video feedback (not my pic)

(realmagicvideofeedbackloop.tumblr.com)



Space-Time Dynamics in
Video Feedback
Jim Crutchfield, 1984



TV innards as sound source

(Duff/1993/4)



**Brighton
Modular
Meet**

How this came about:

(builds on my interest in social capital

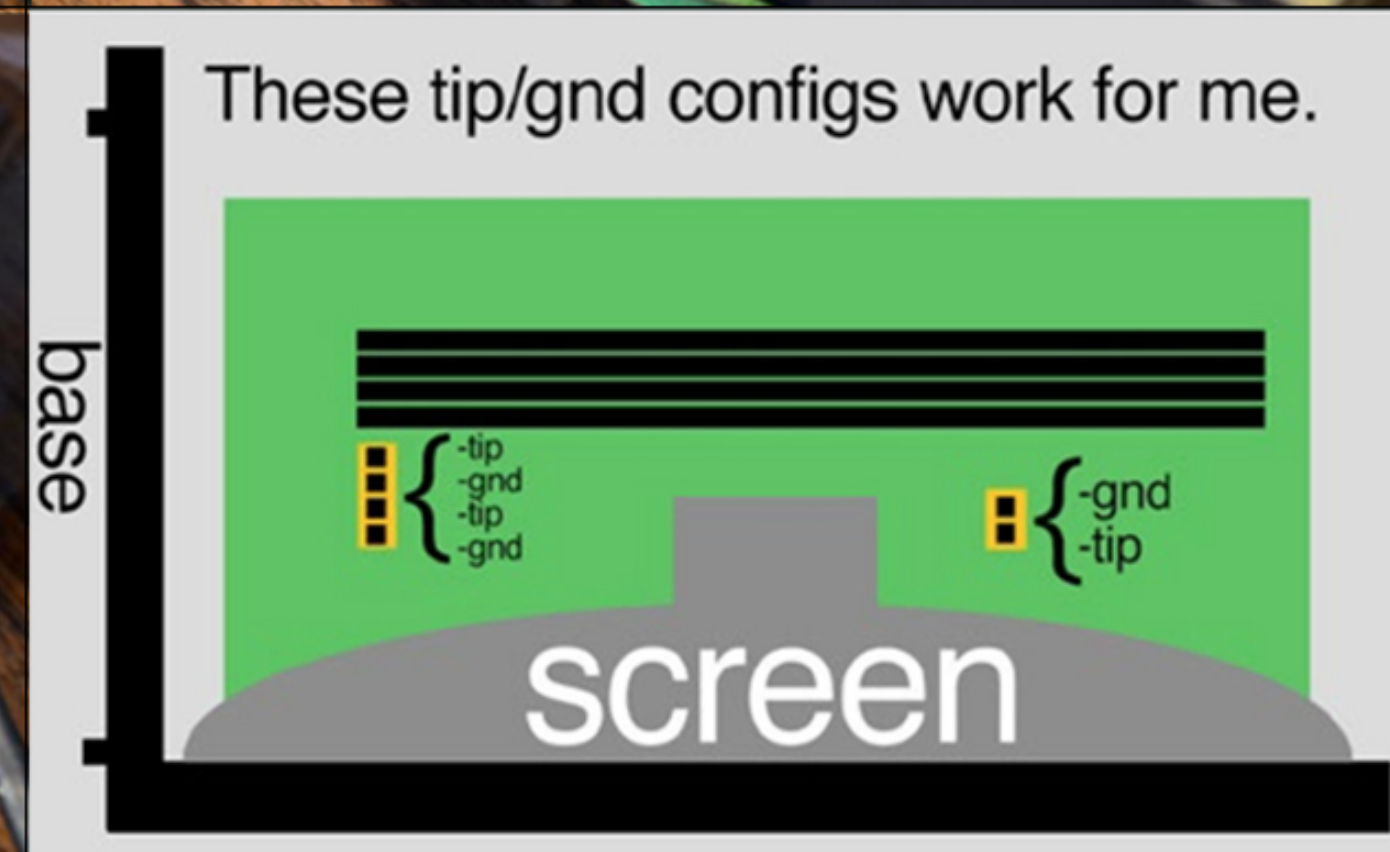
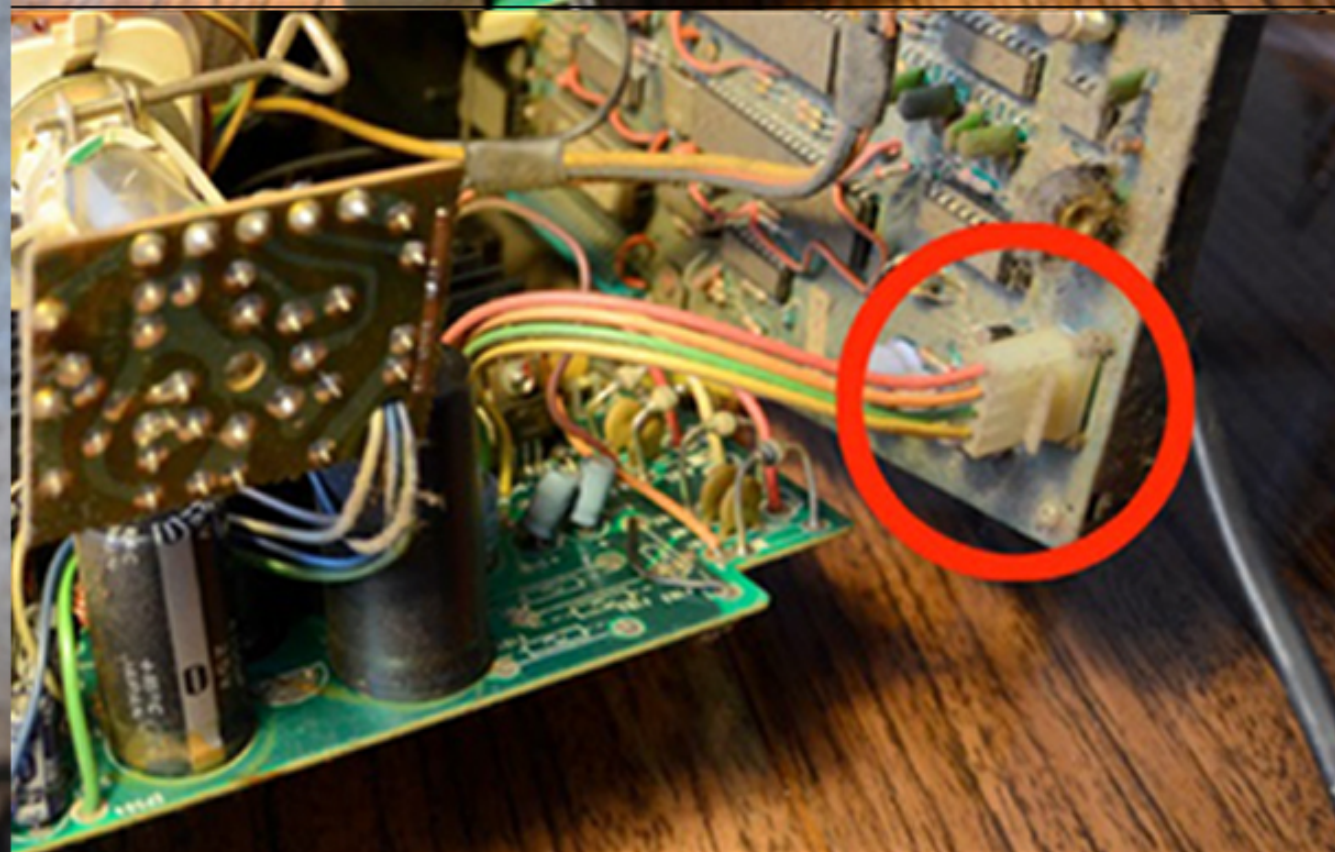
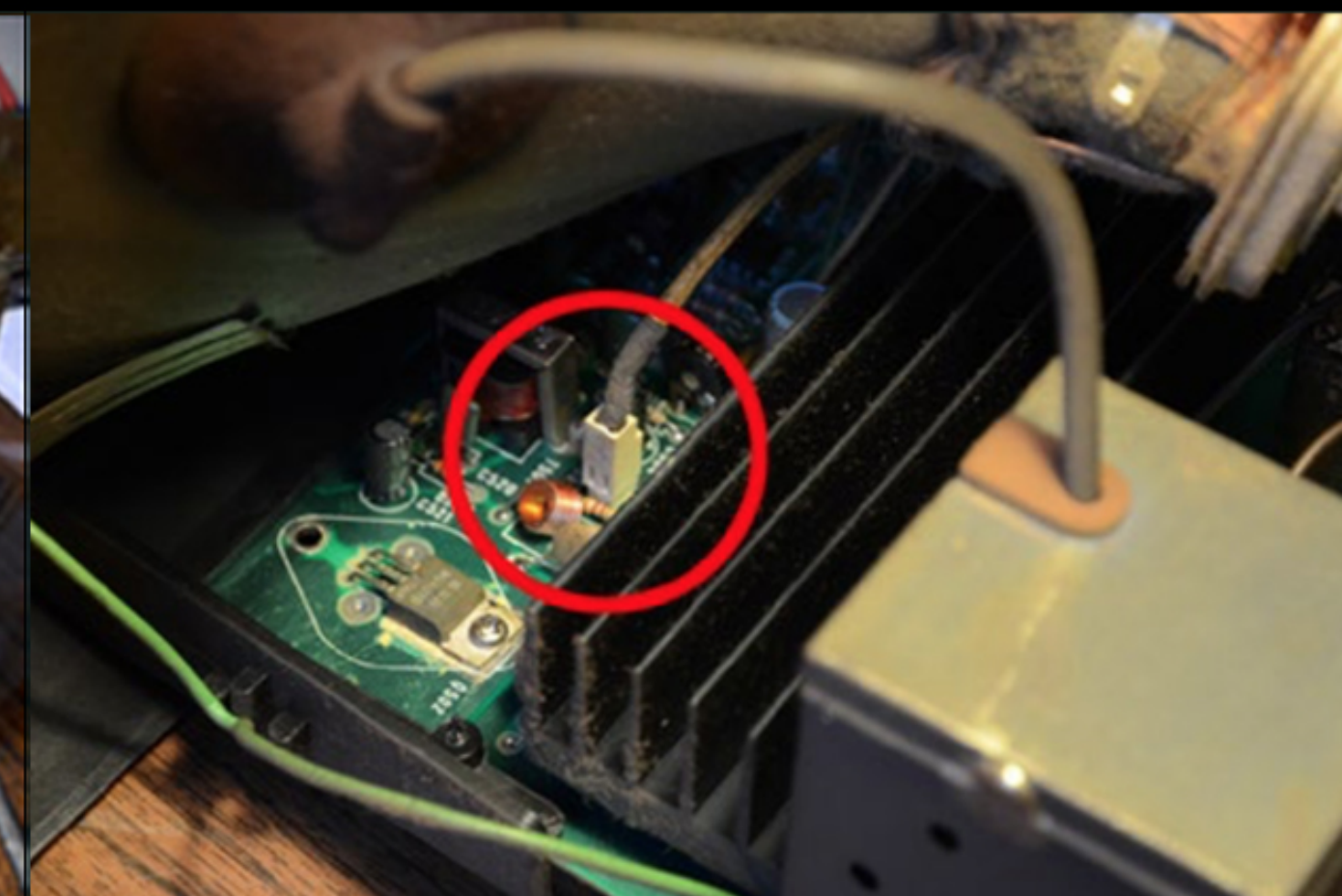
Synths and Social Capital, Sines & Squares 2014

http://econtact.ca/17_4/duff_socialcapital.html)

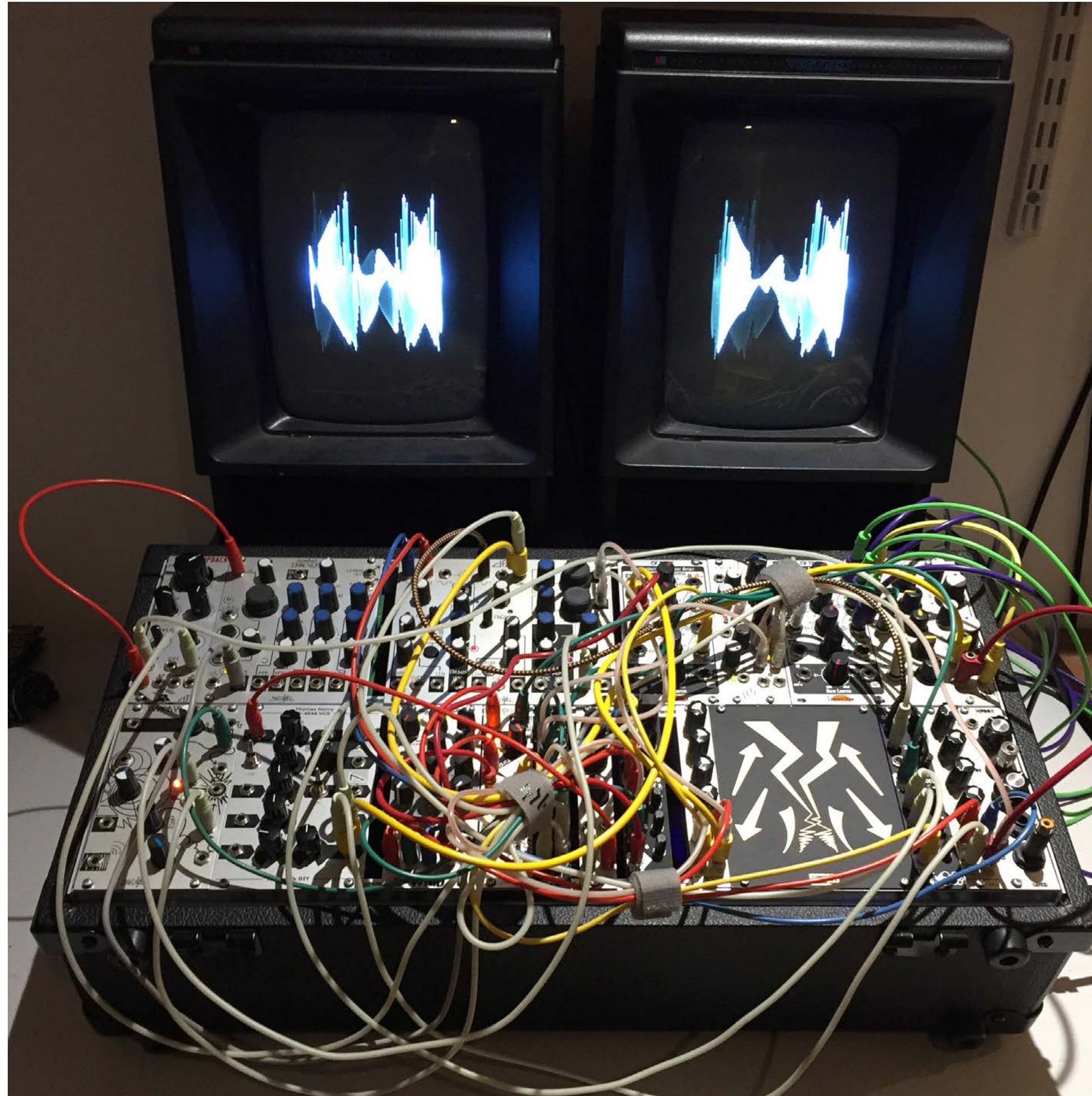
**Wanted video synths at the modular meet,
through this Alex Peverett brought his rig along in 2014.**

Alex pointed me at a thread on a modular synth forum.

**I tried to make sense of the info and contributed to the
thread made a pdf outlining how to do the modification.**



(secret)techniques



typical set-up:

**oscillation
frequency 'y':
up & down**



y

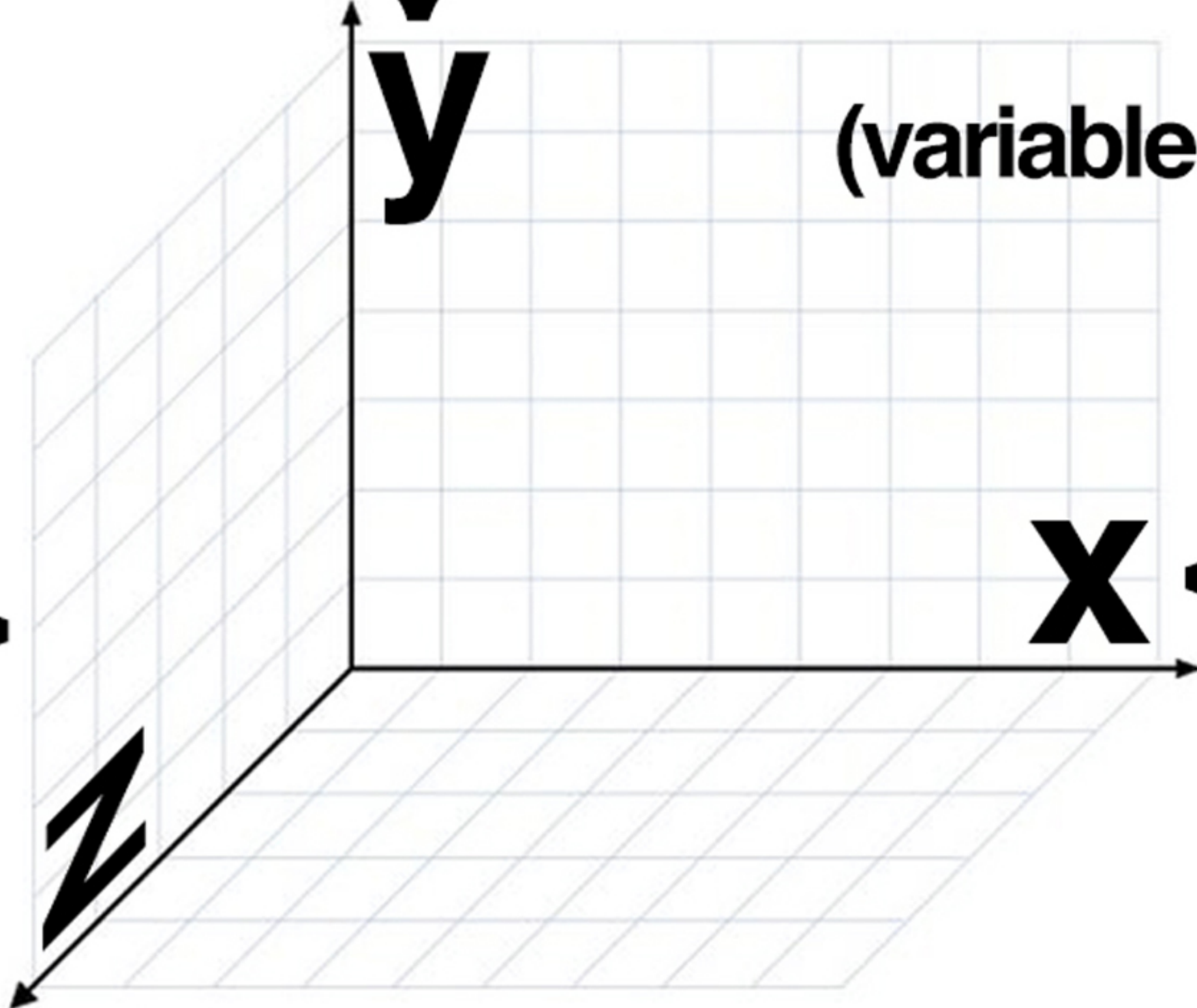
(variable & different)

x

**oscillation
frequency 'x':
left & right.**

**oscillation for
overall image
brightness**

**(constant & stable)
...maybe**

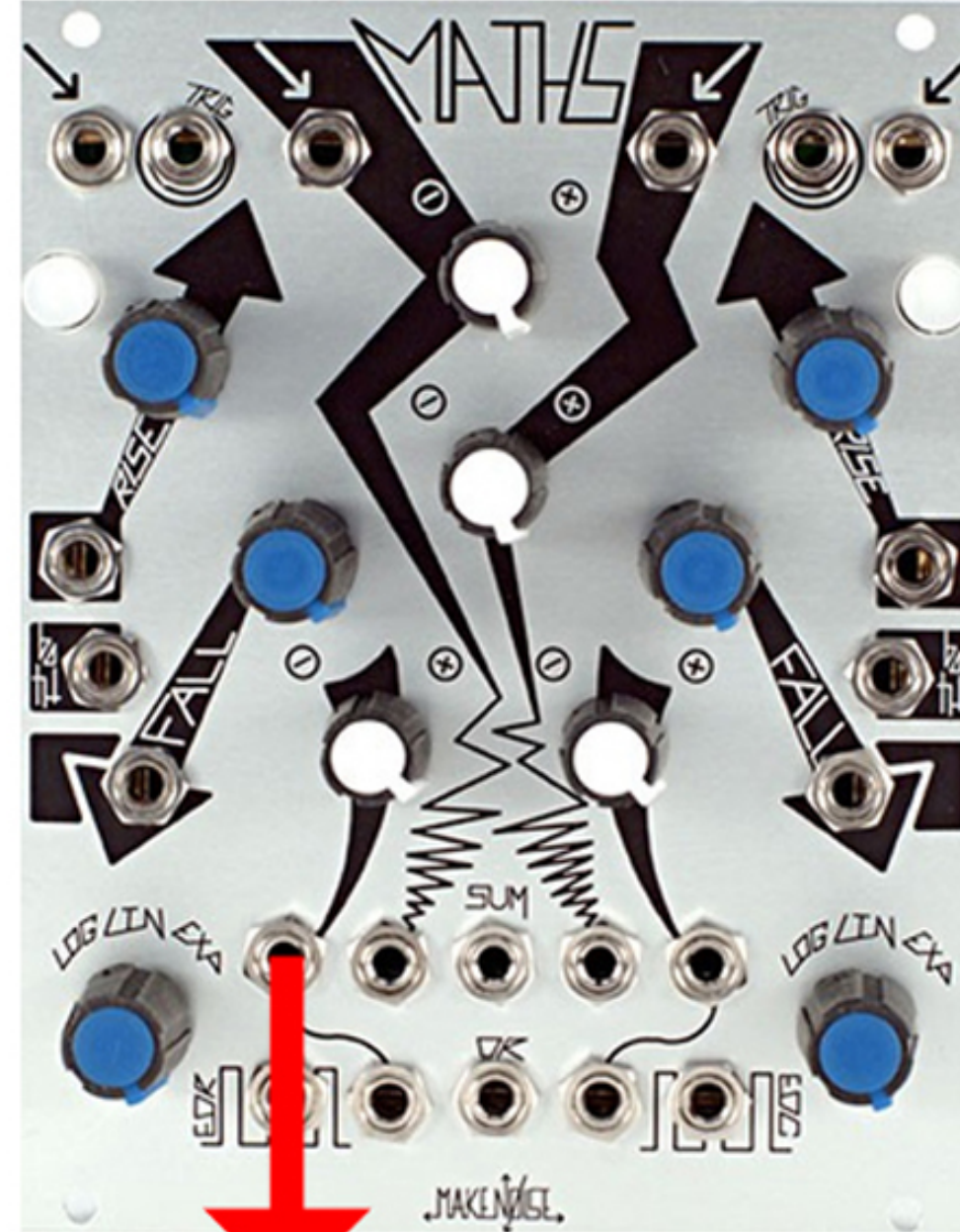
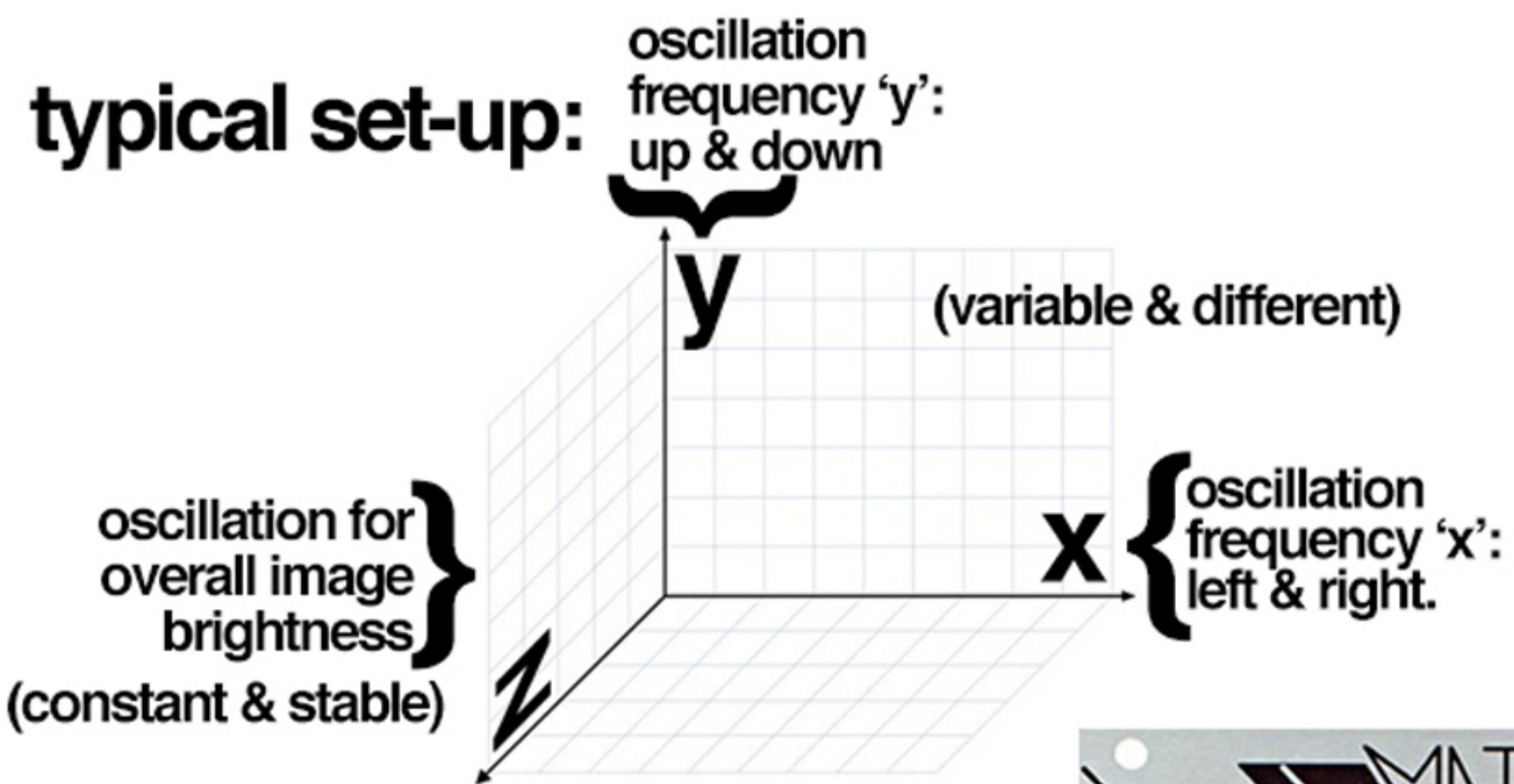


Main tool for offset + attenuation:



} to move & scale.

+ combinations of other modules that make interesting shapes.



z



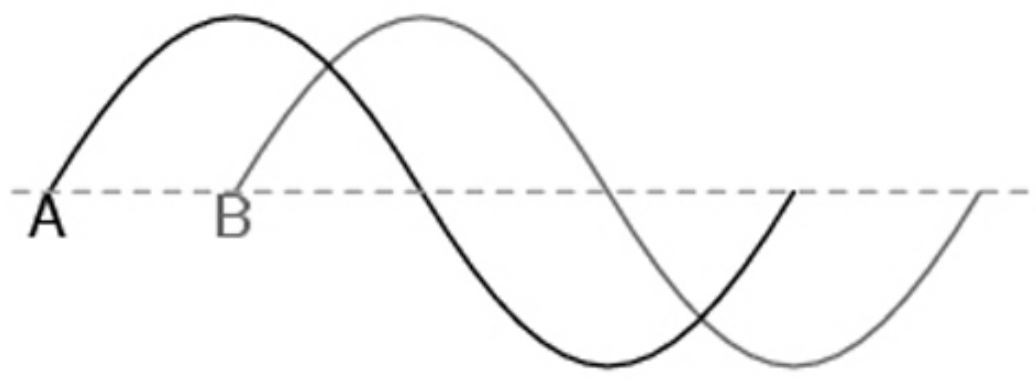
a useful module...



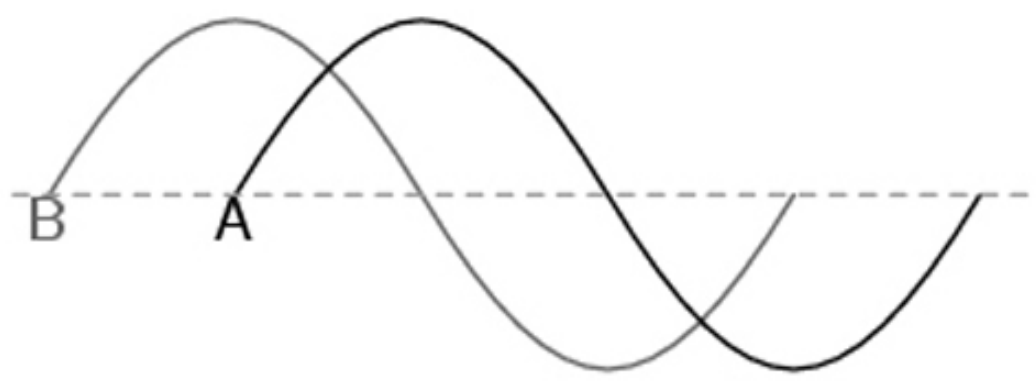
Phase Displacement Oscillator

} phase shift

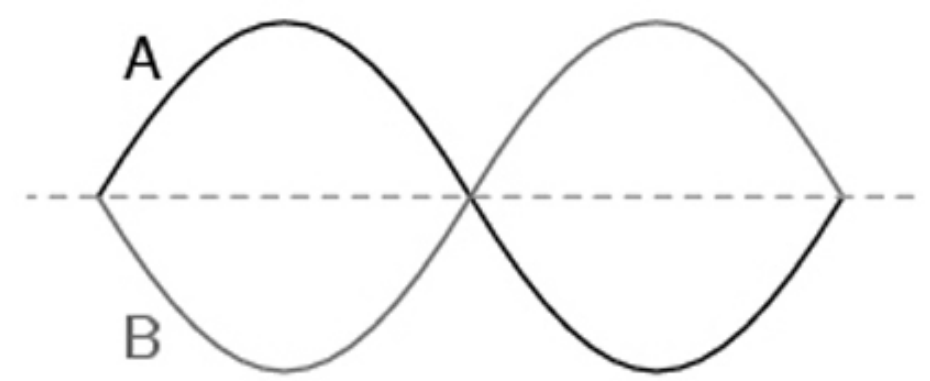
} output A, B, etc.



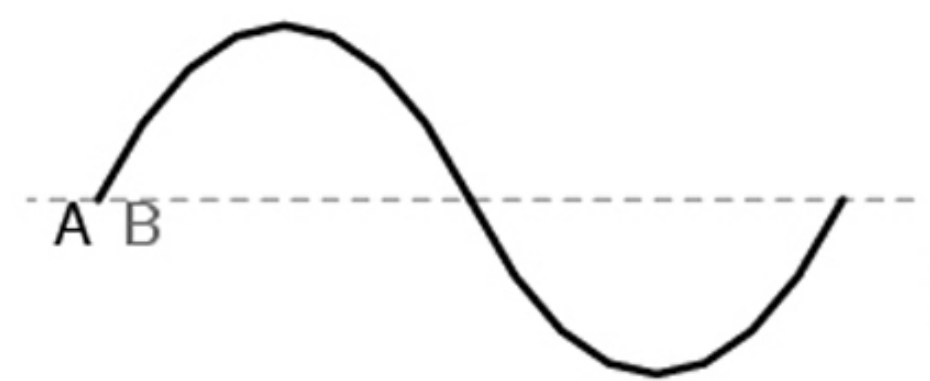
Phase shift = 90 degrees
A is ahead of B
(A "leads" B)



Phase shift = 90 degrees
B is ahead of A
(B "leads" A)

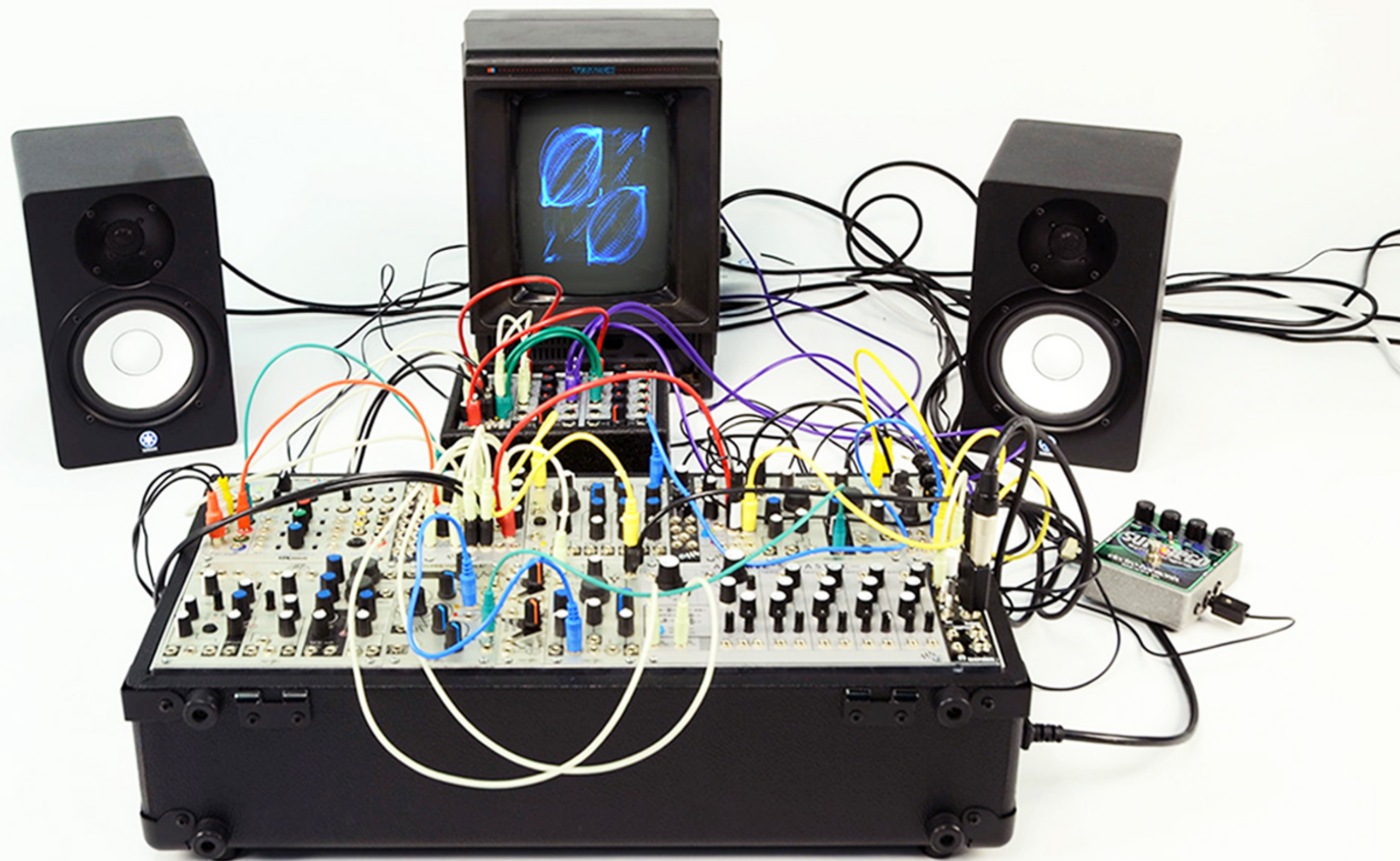


Phase shift = 180 degrees
A and B waveforms are
mirror-images of each other

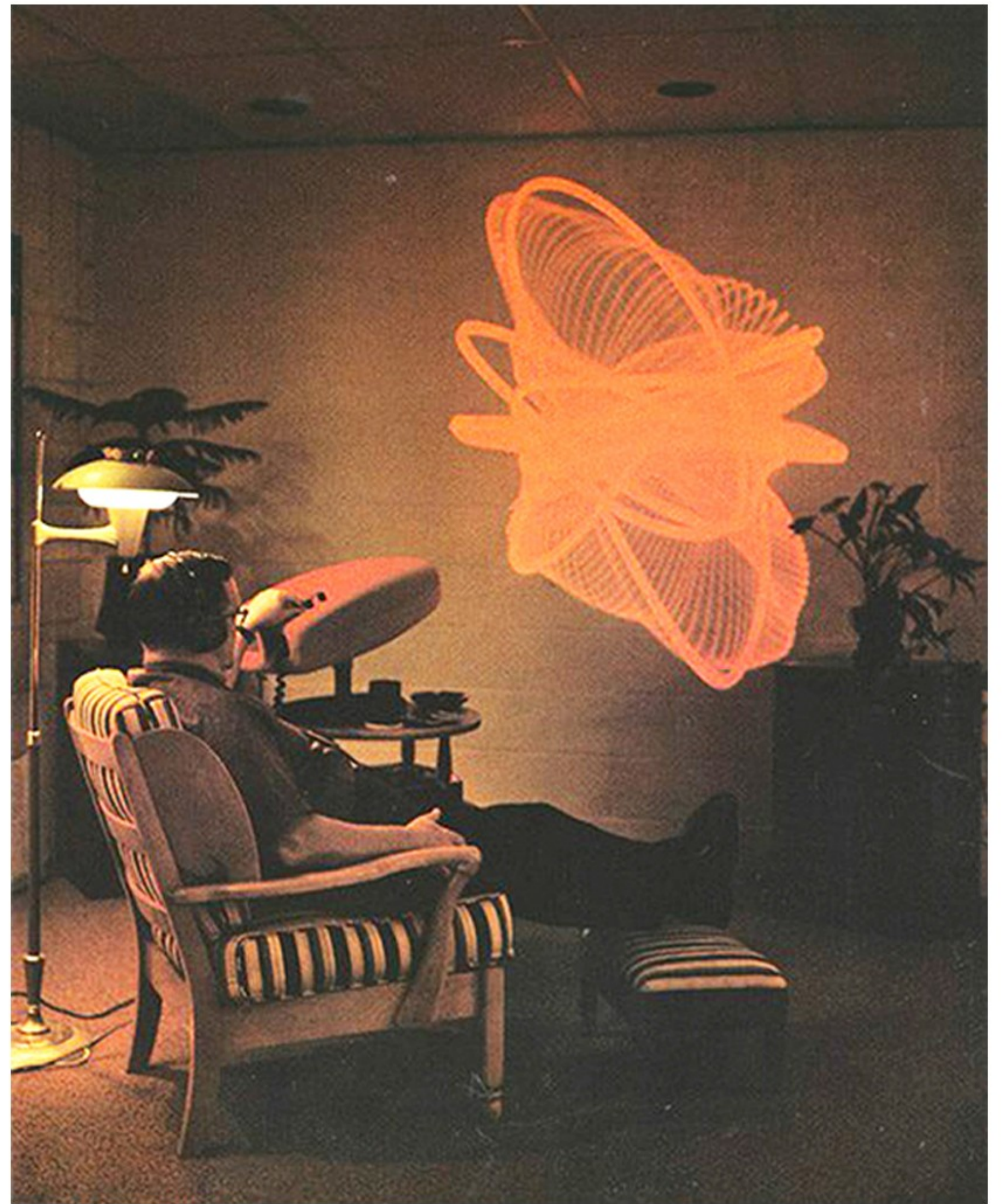


Phase shift = 0 degrees
A and B waveforms are
in perfect step with each other

Oscilloscopes can sound unpleasant, so...

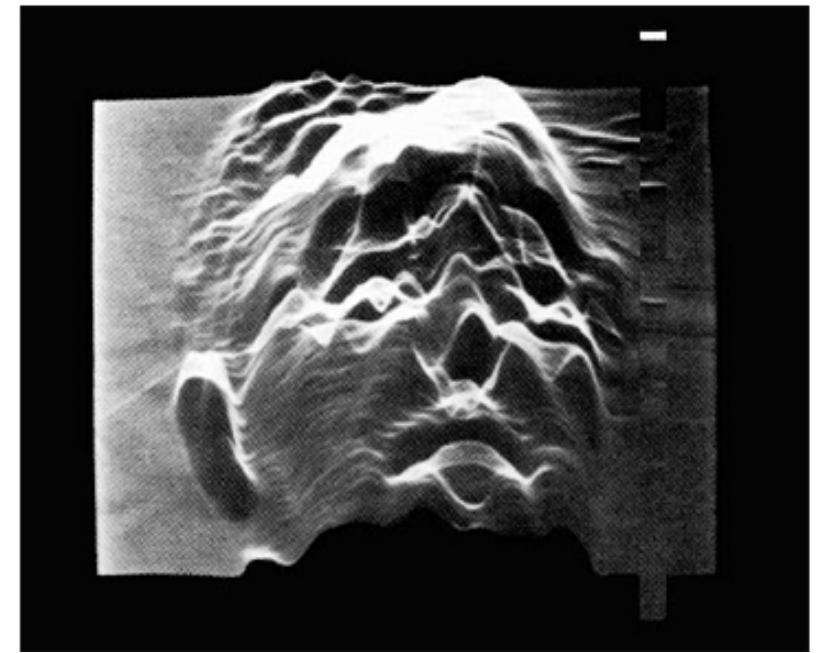
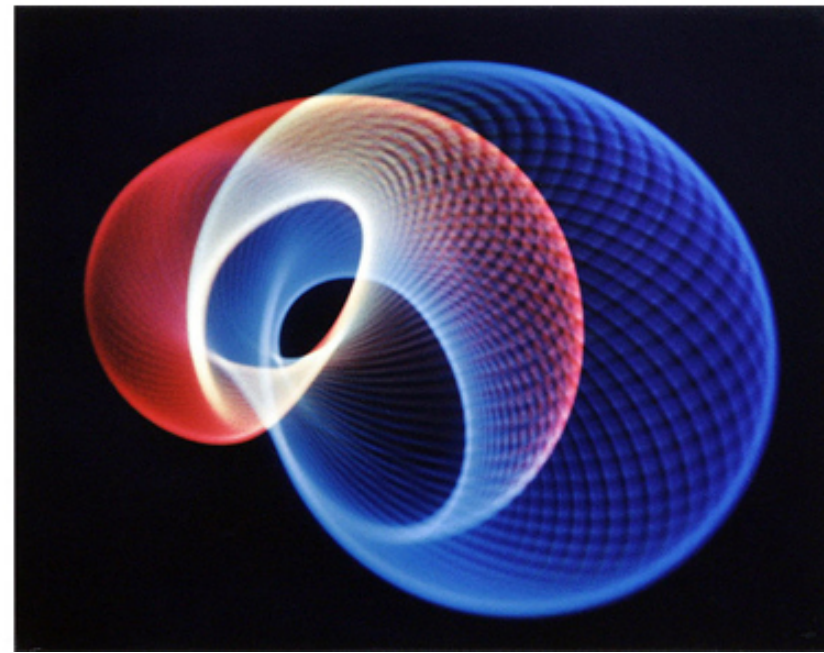
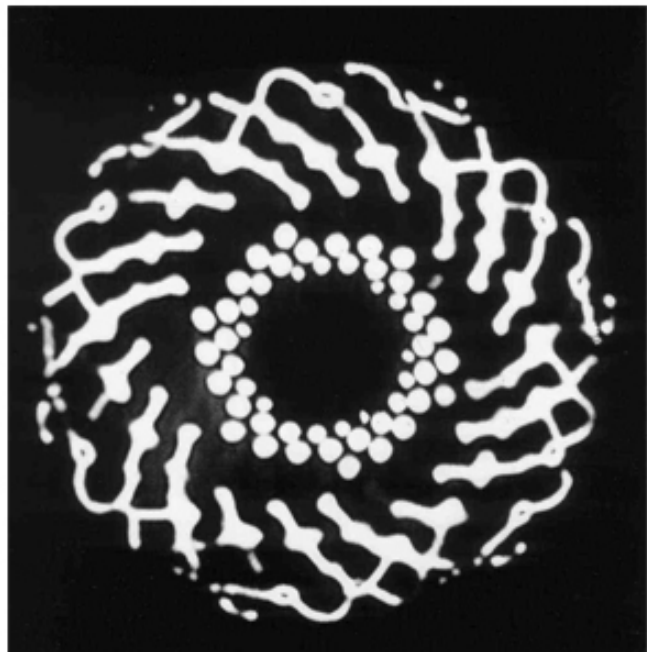


**Generally my
creative process**

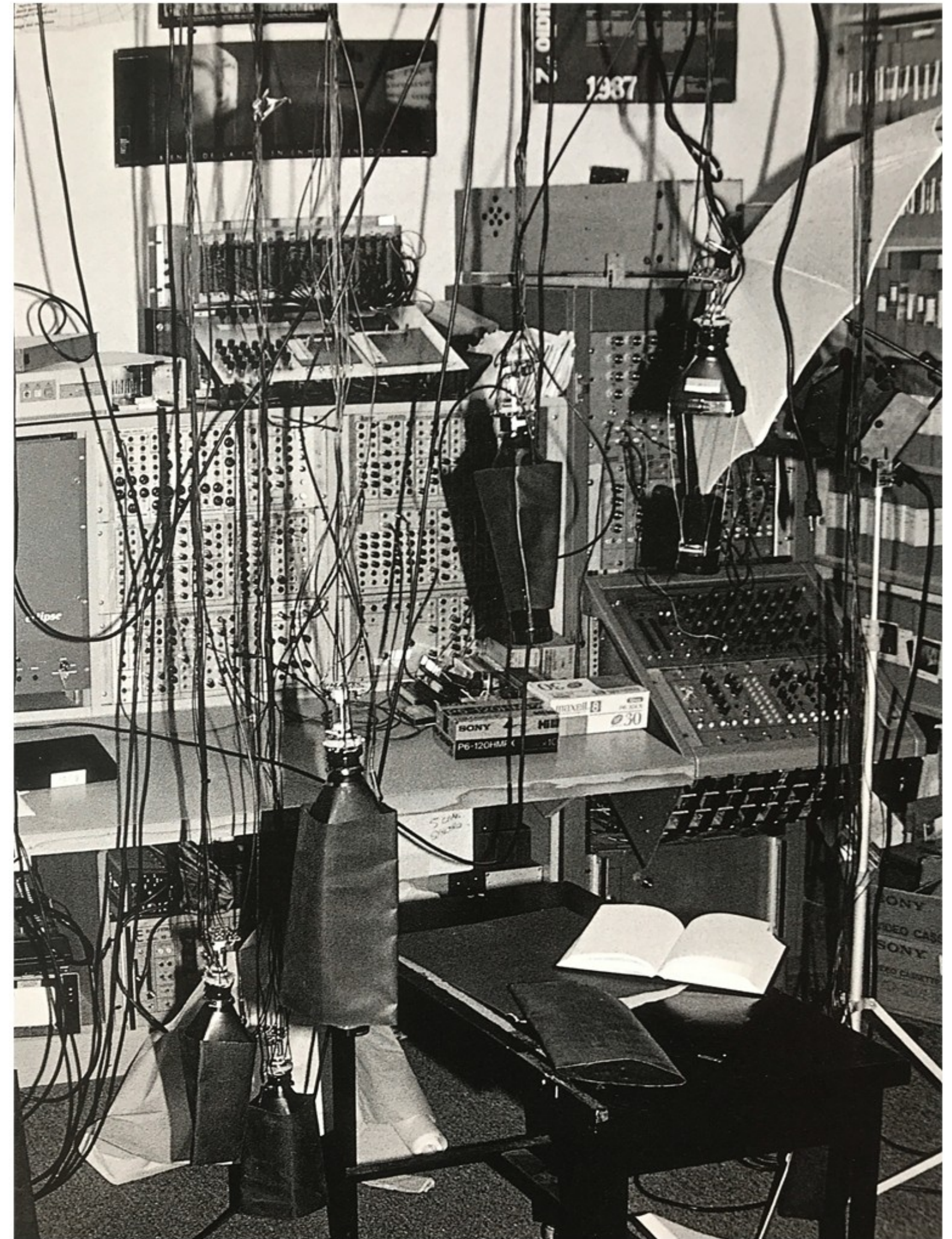


Reflection Remembering Research

Influential works
Social media sharing
Dreams of past technology
(& a weird time at Art School)

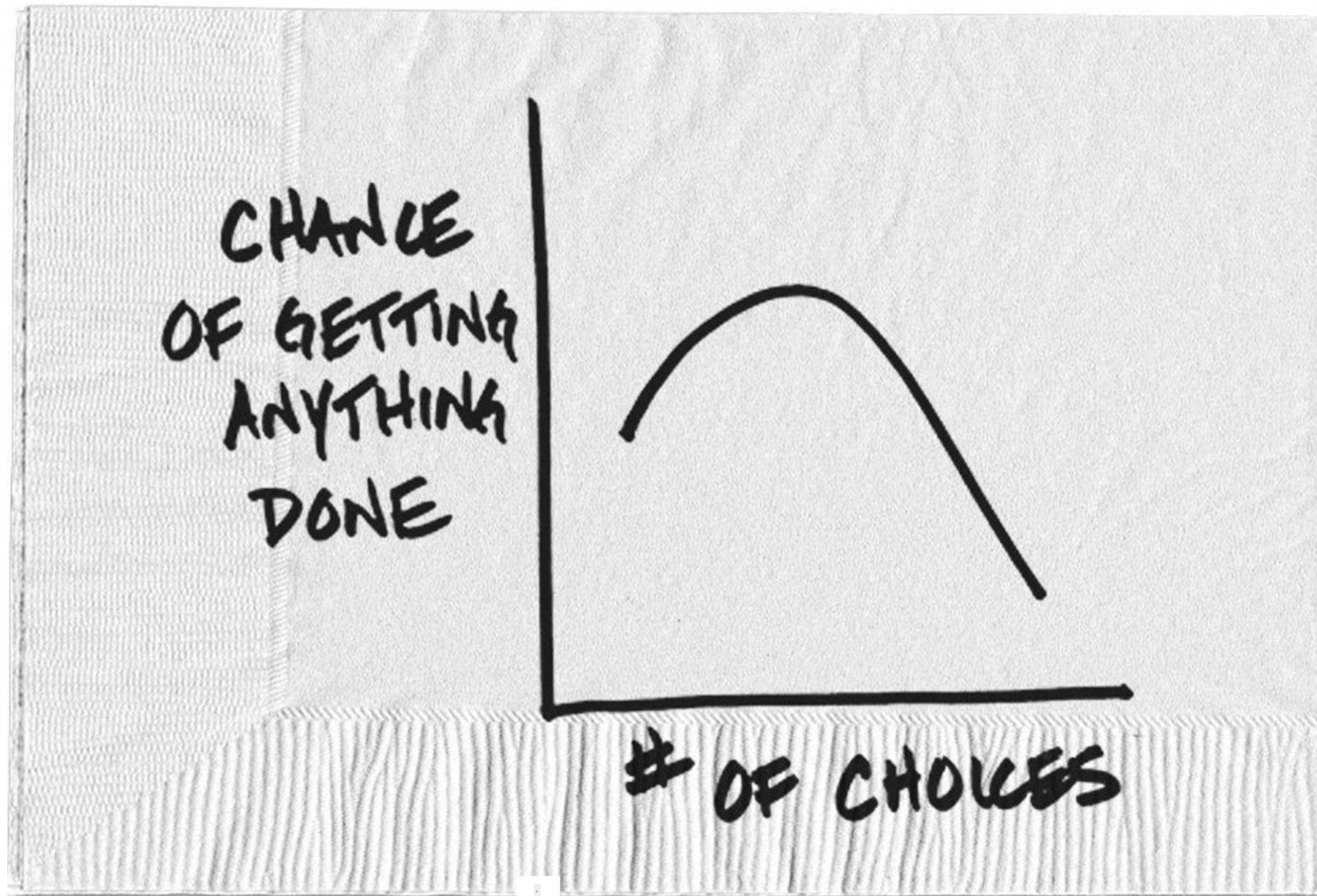


Gary Hill's studio (from 1993 MOMA Oxford catalogue)





MAX!!! ...but maths



I am not any of these:

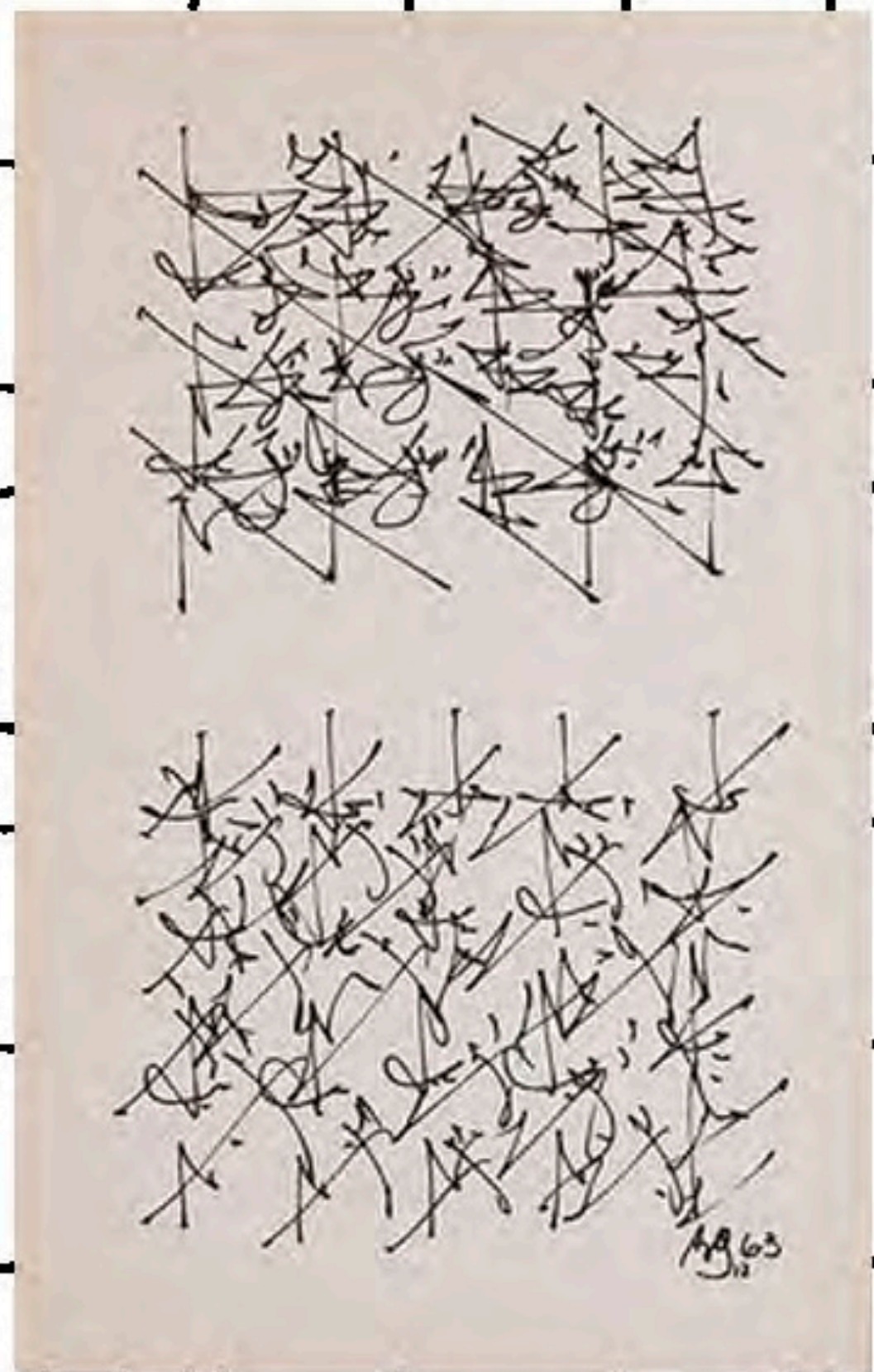
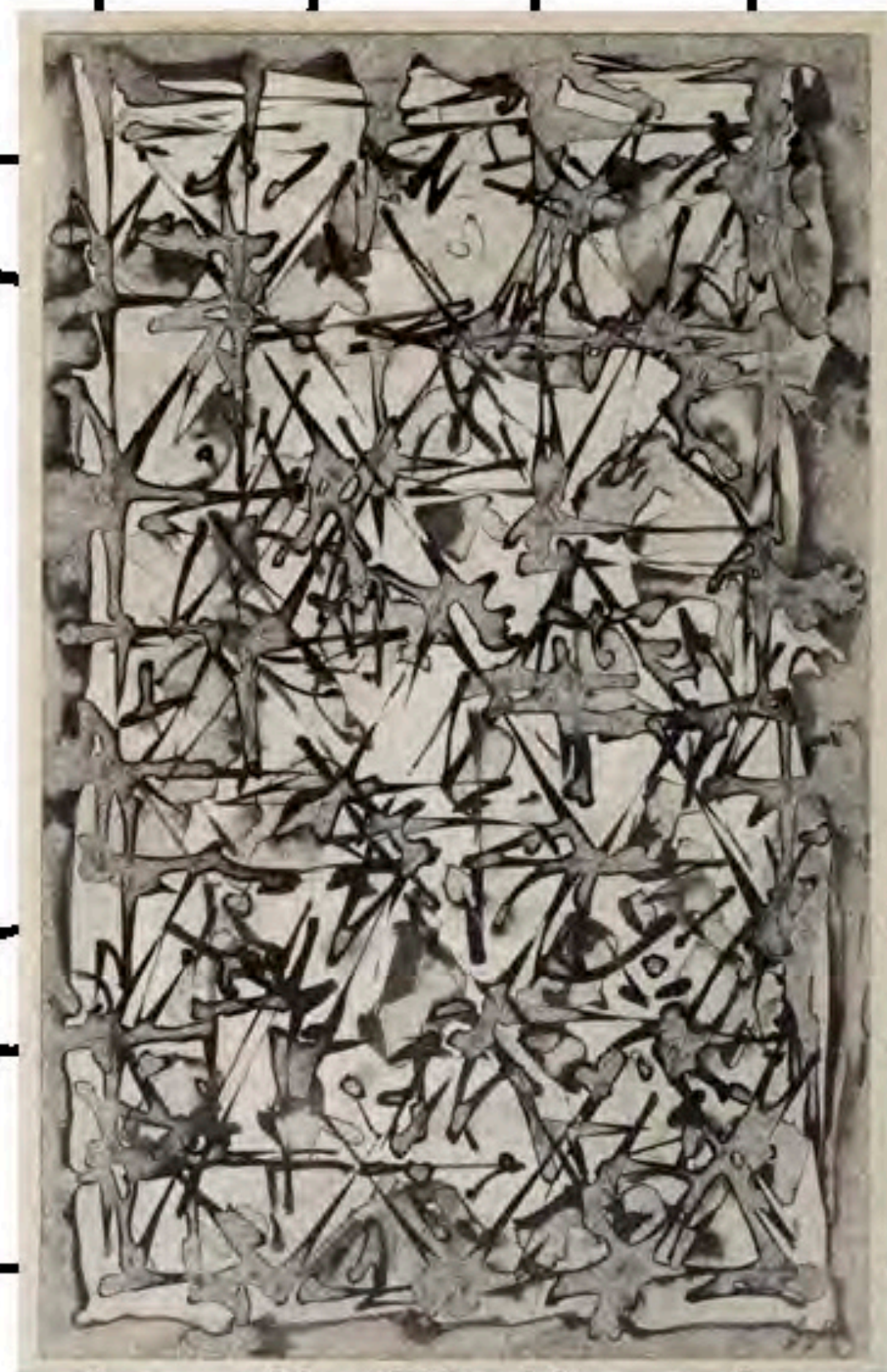


**I am interested in
the aesthetics of drawing
with sound.**

Burroughs & Gysin



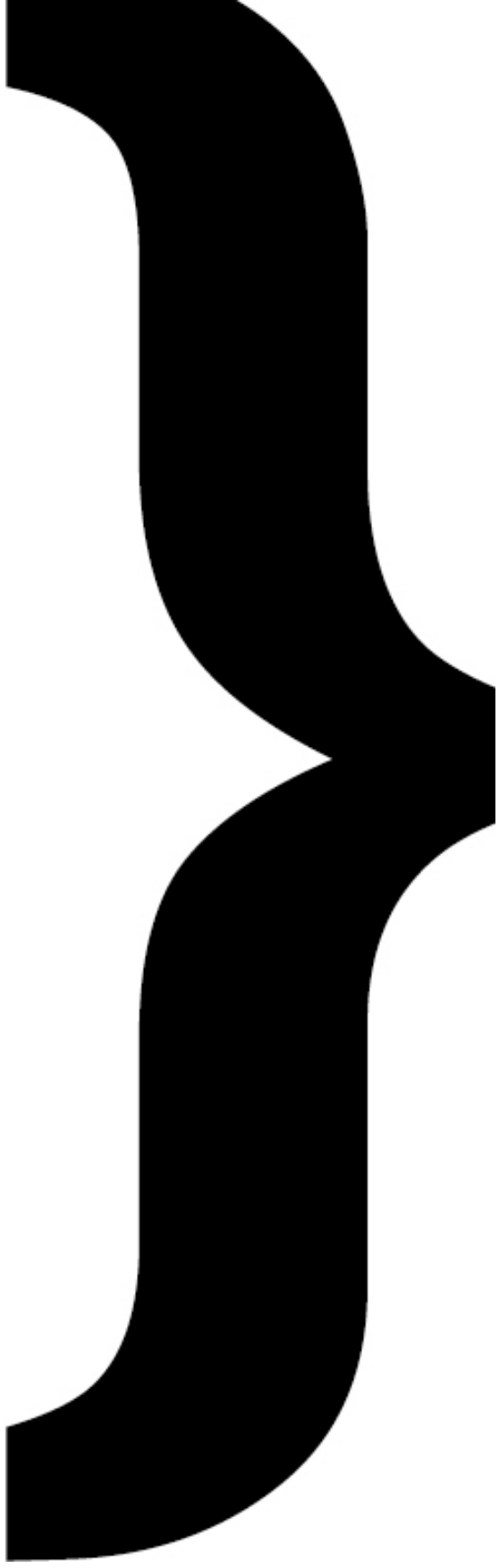
cut-up technique



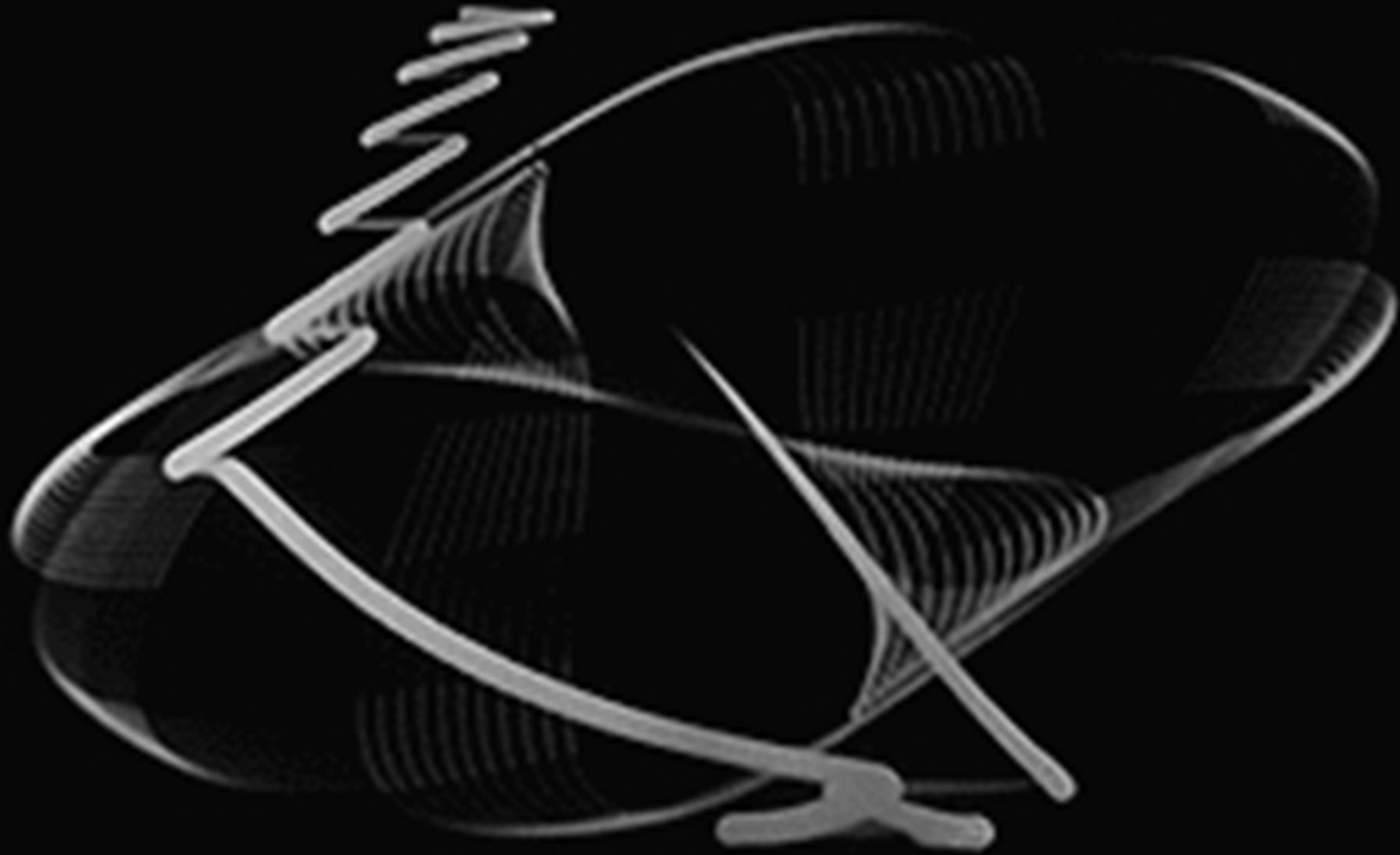
**bewilderment
amazement
awe** } **computer
art processes**

**I don't (want to) understand how
these tools work but I do
understand how to use them**

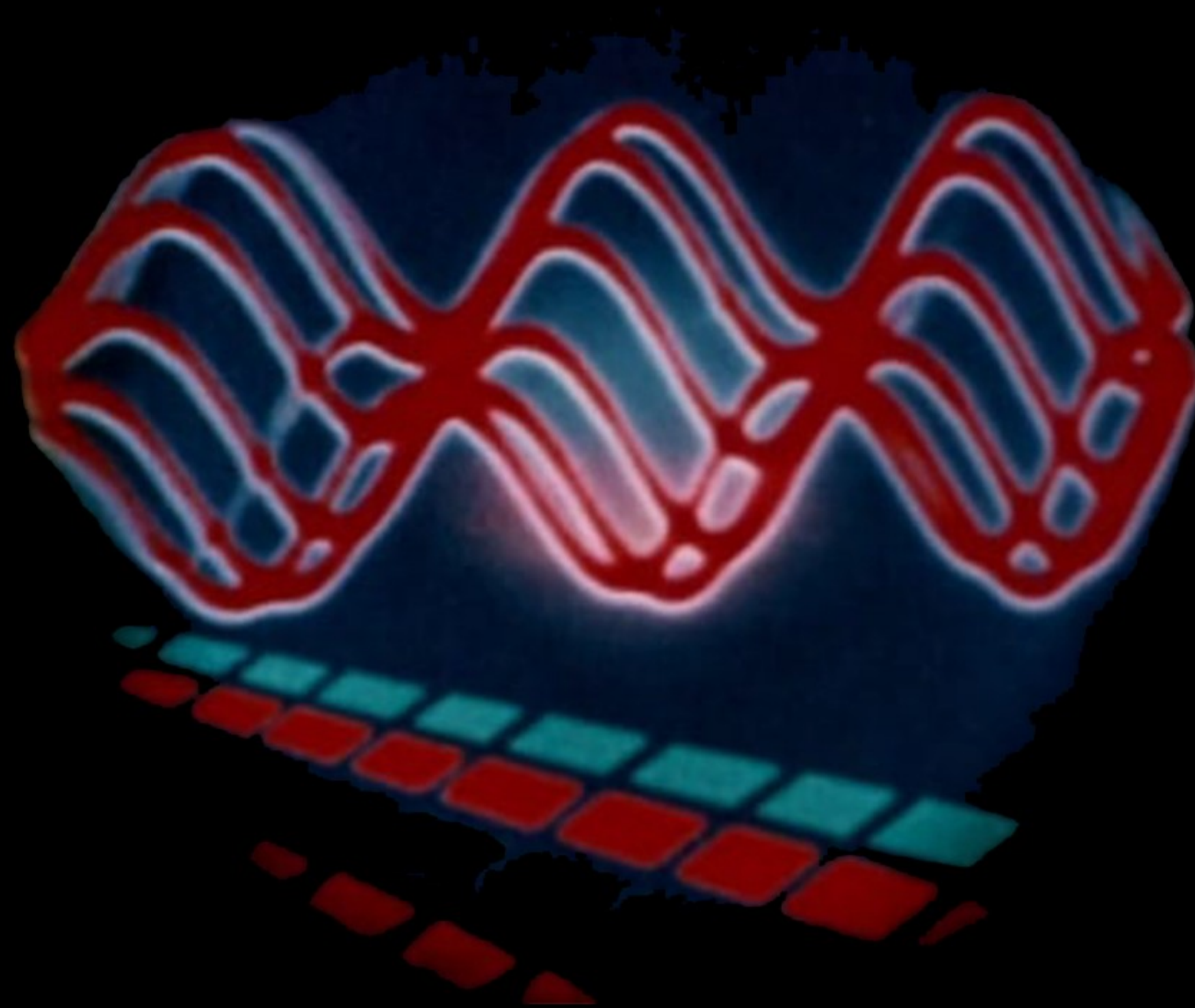
Early oscilloscope art work and influences 1950s +



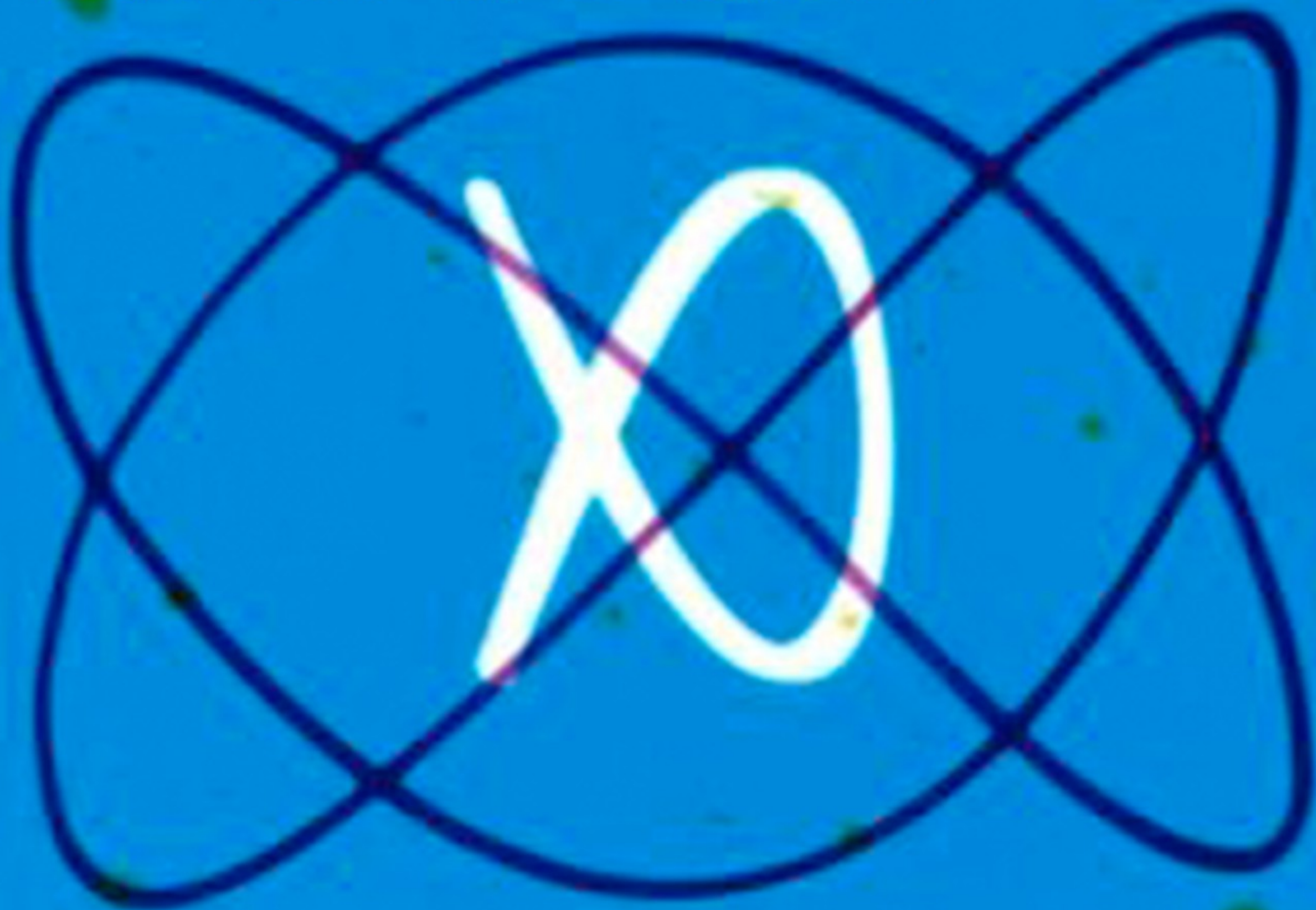
Mary Ellen Bute



Mary Ellen Bute



Norman McLaren

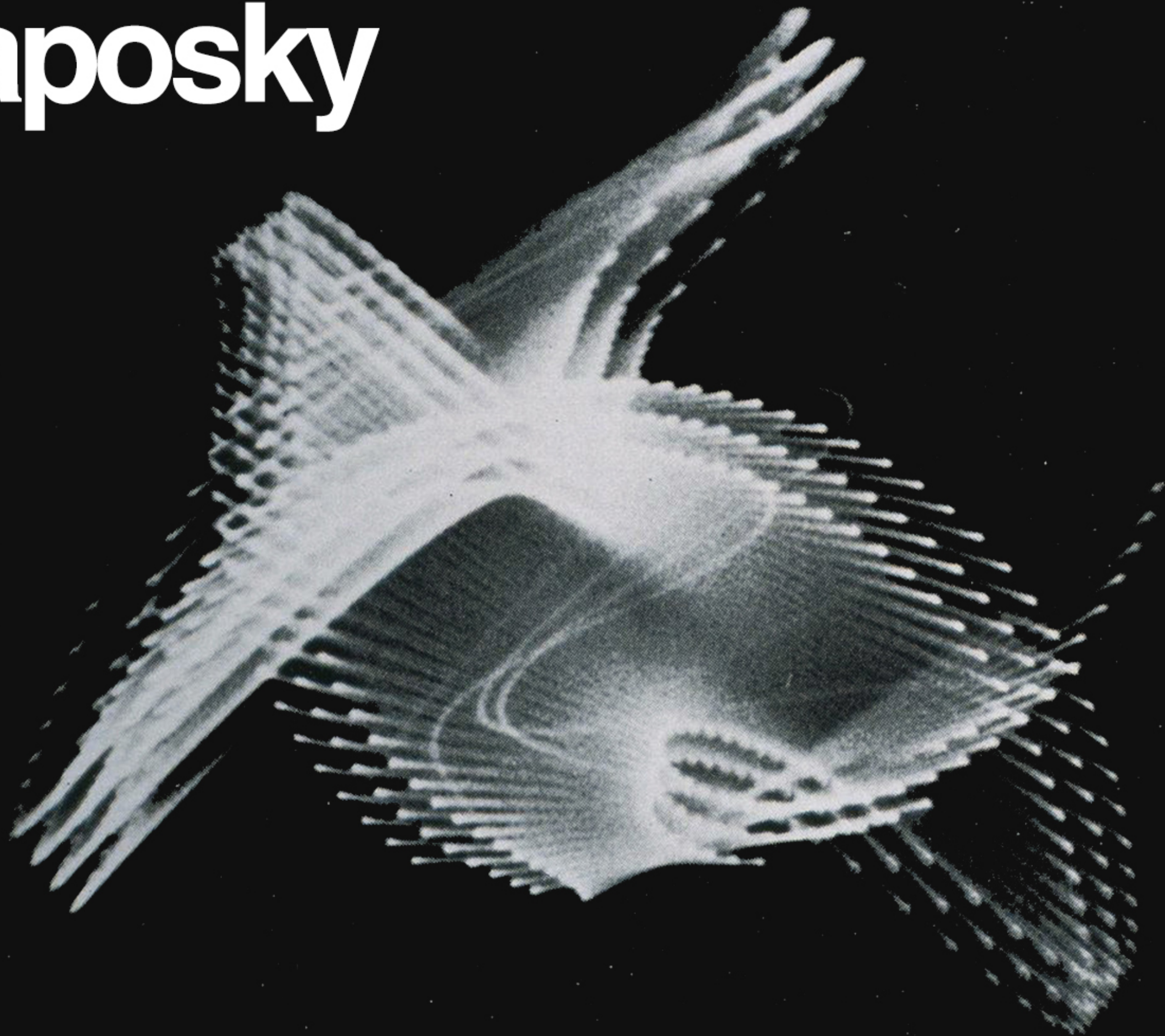




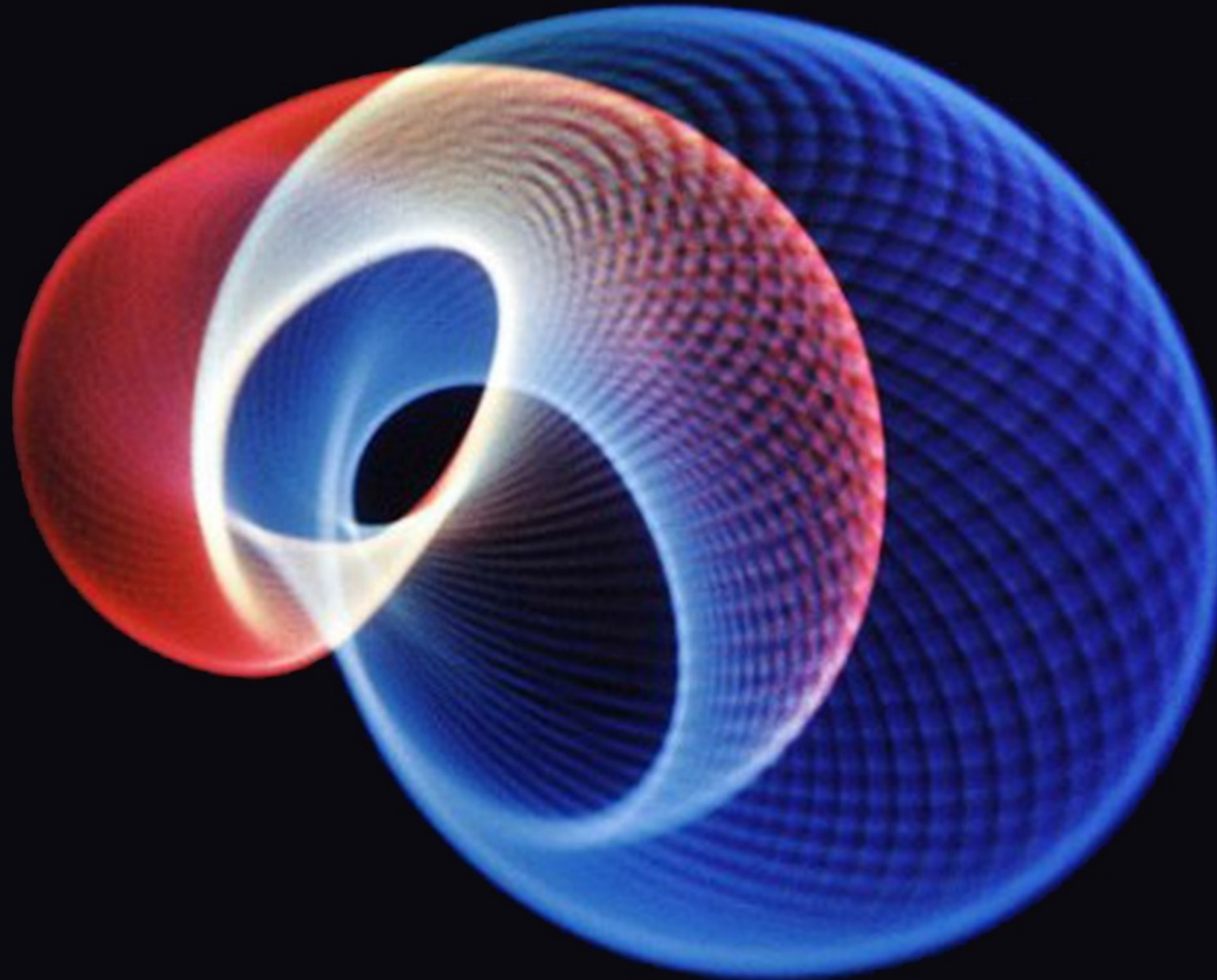
Norman McLaren

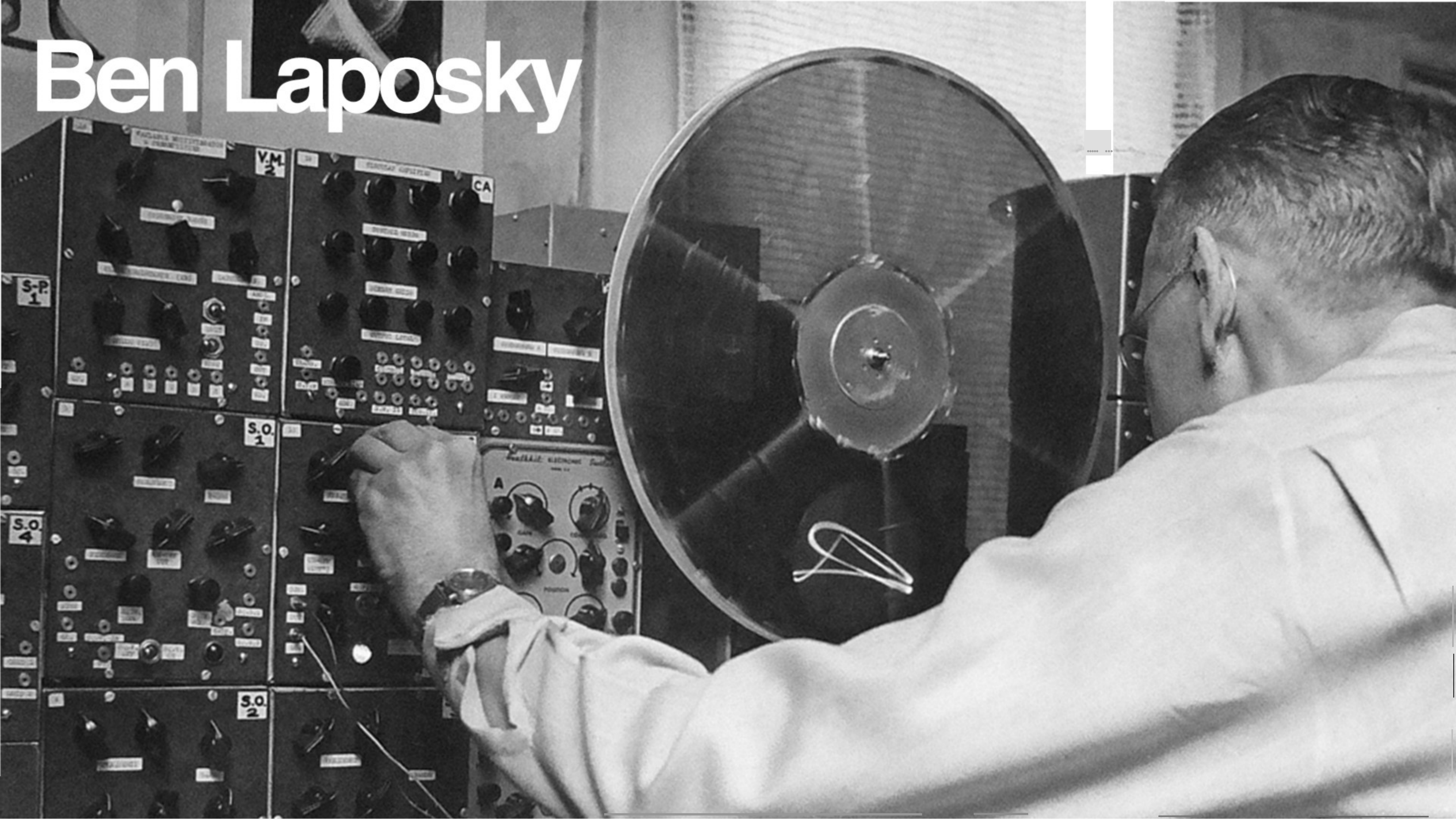
AROUND IS AROUND

Ben Laposky



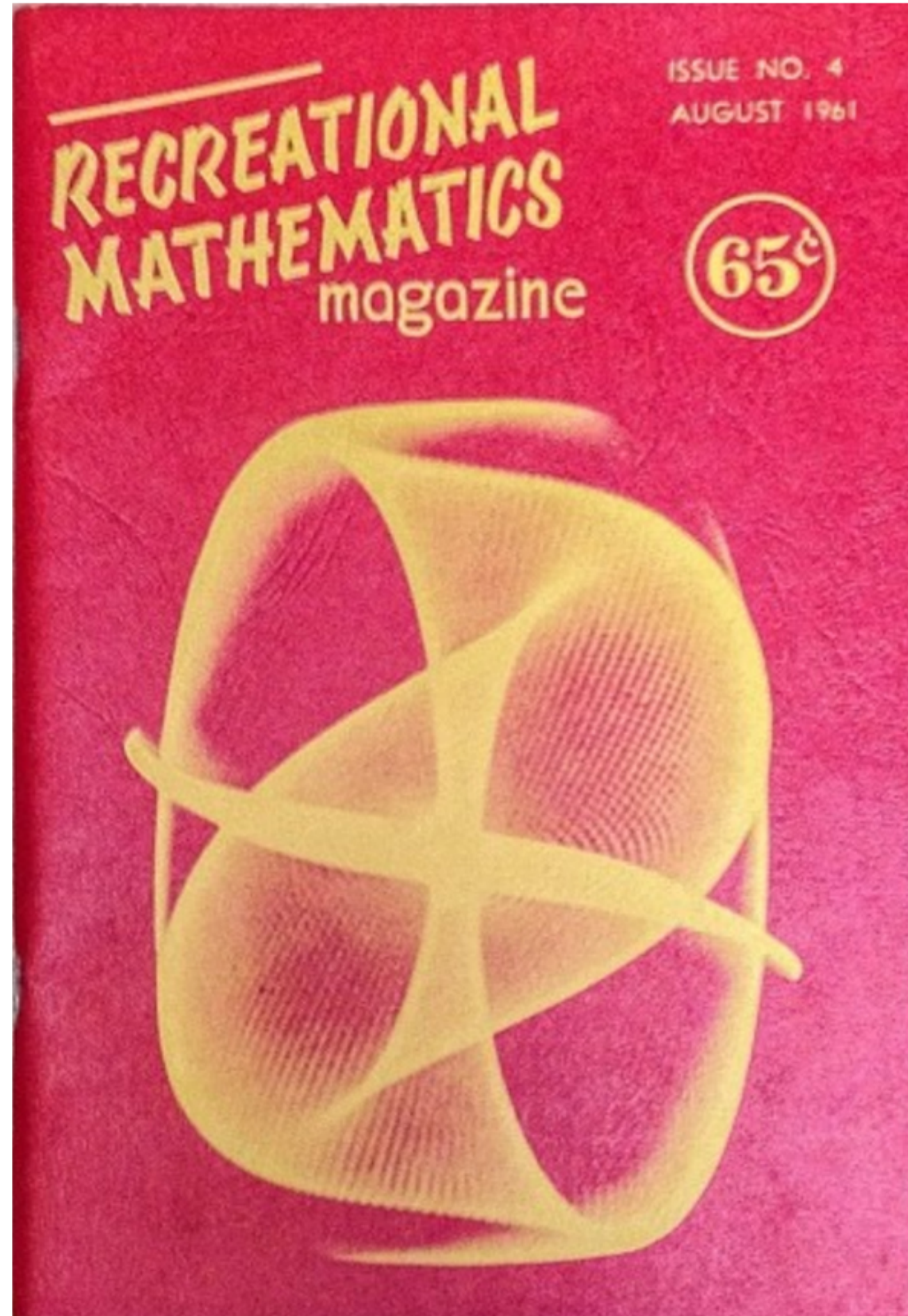
Ben Laposky



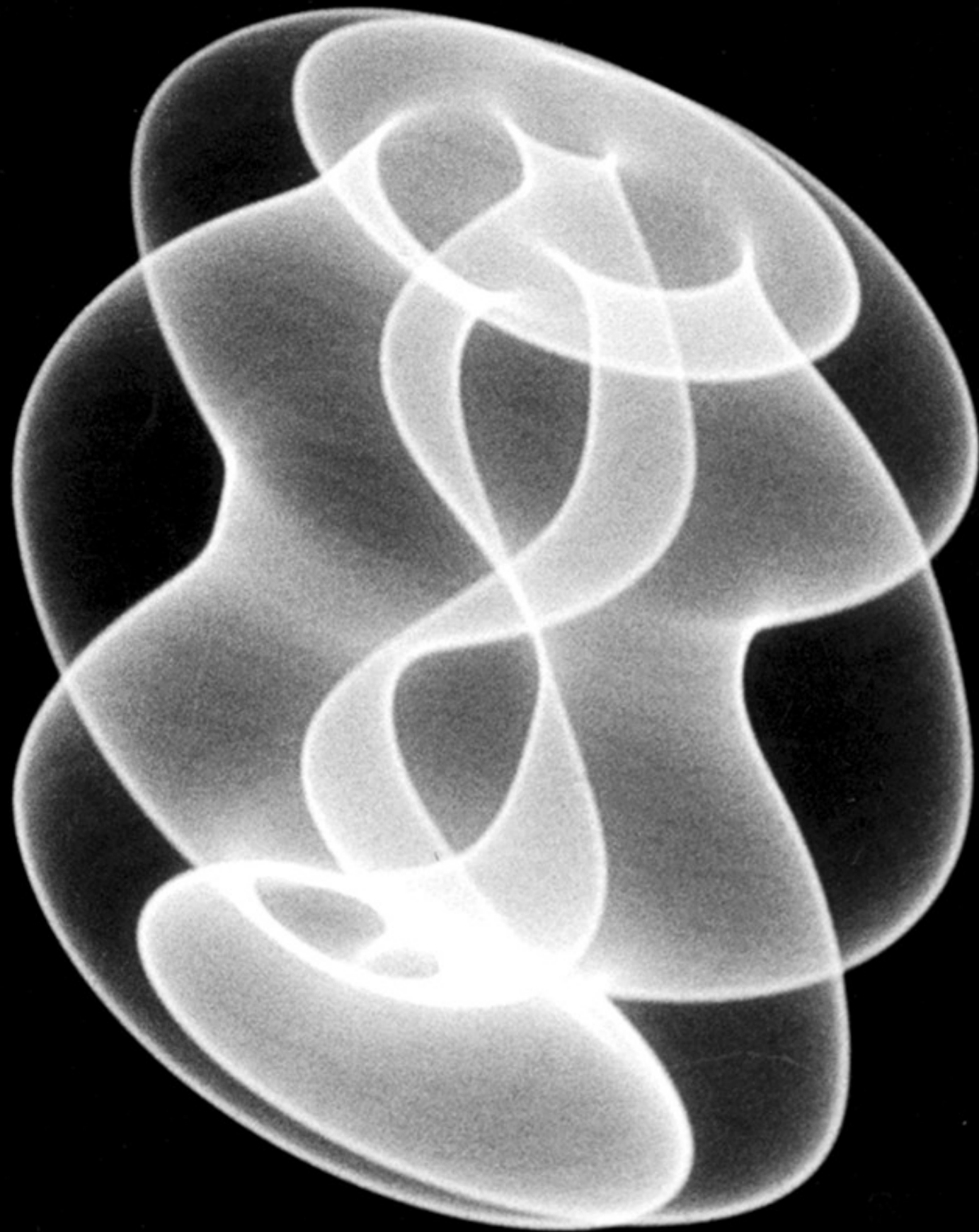


Ben Laposky

Ben Laposky



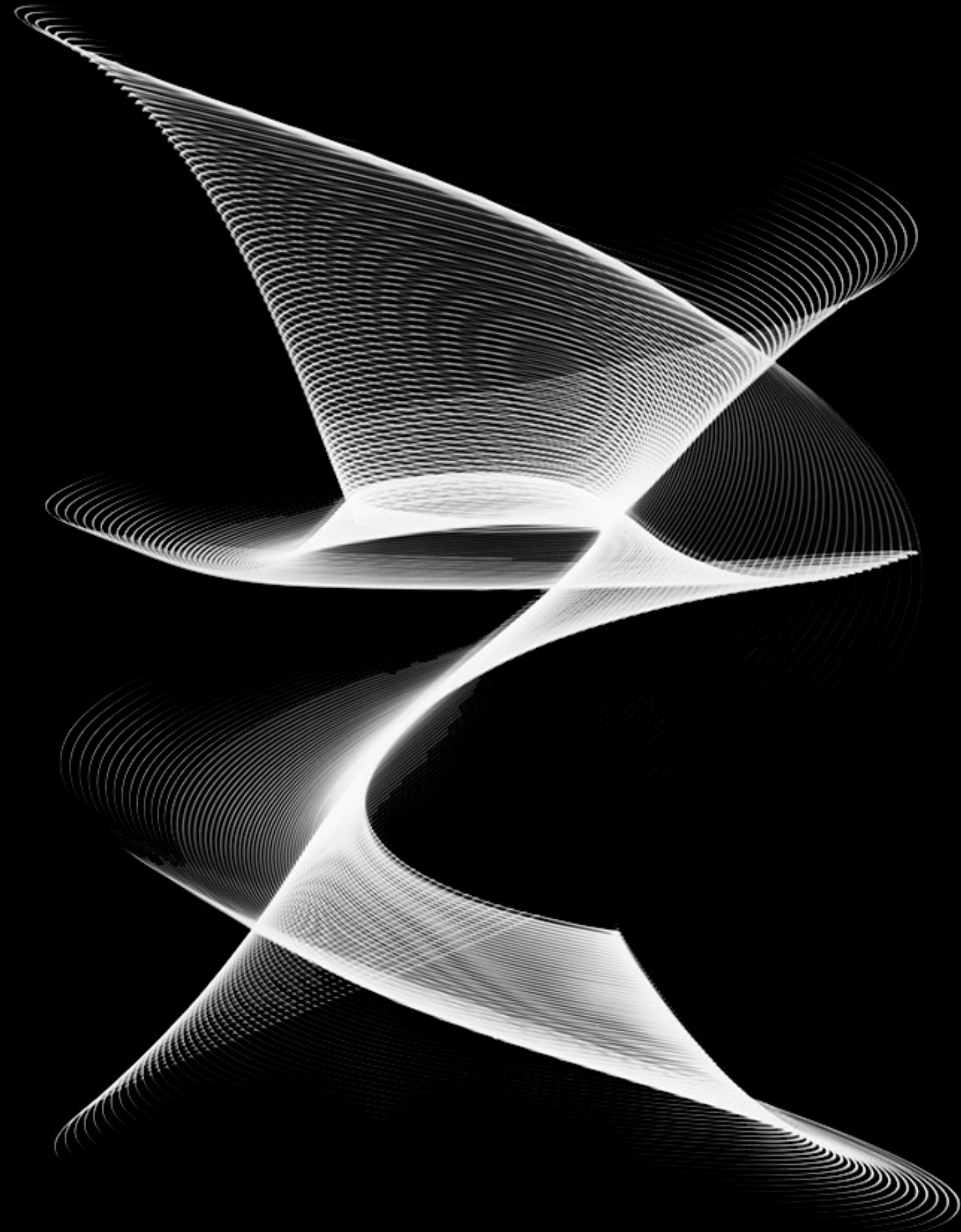
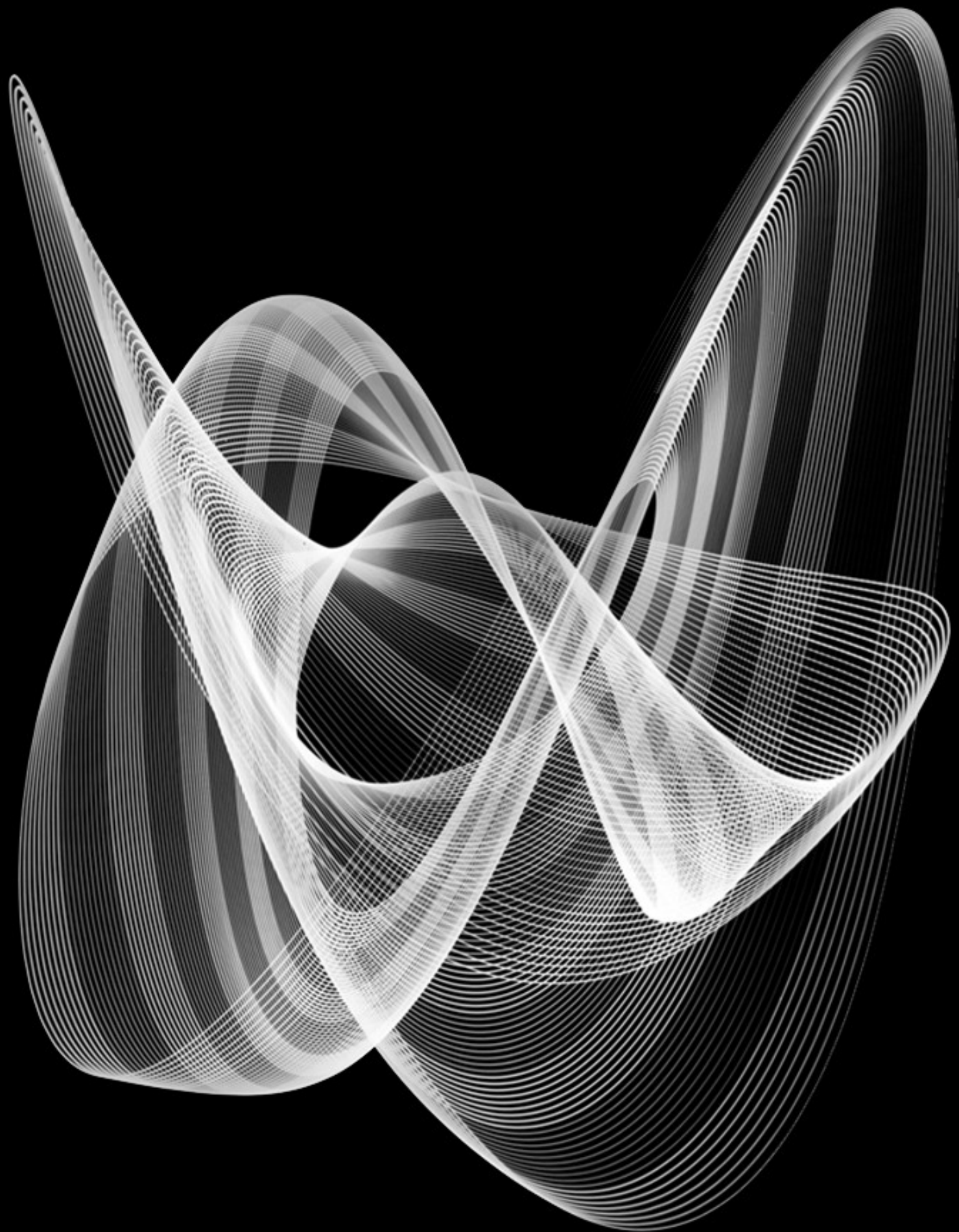
Herbert W. Franke



Herbert W. Franke



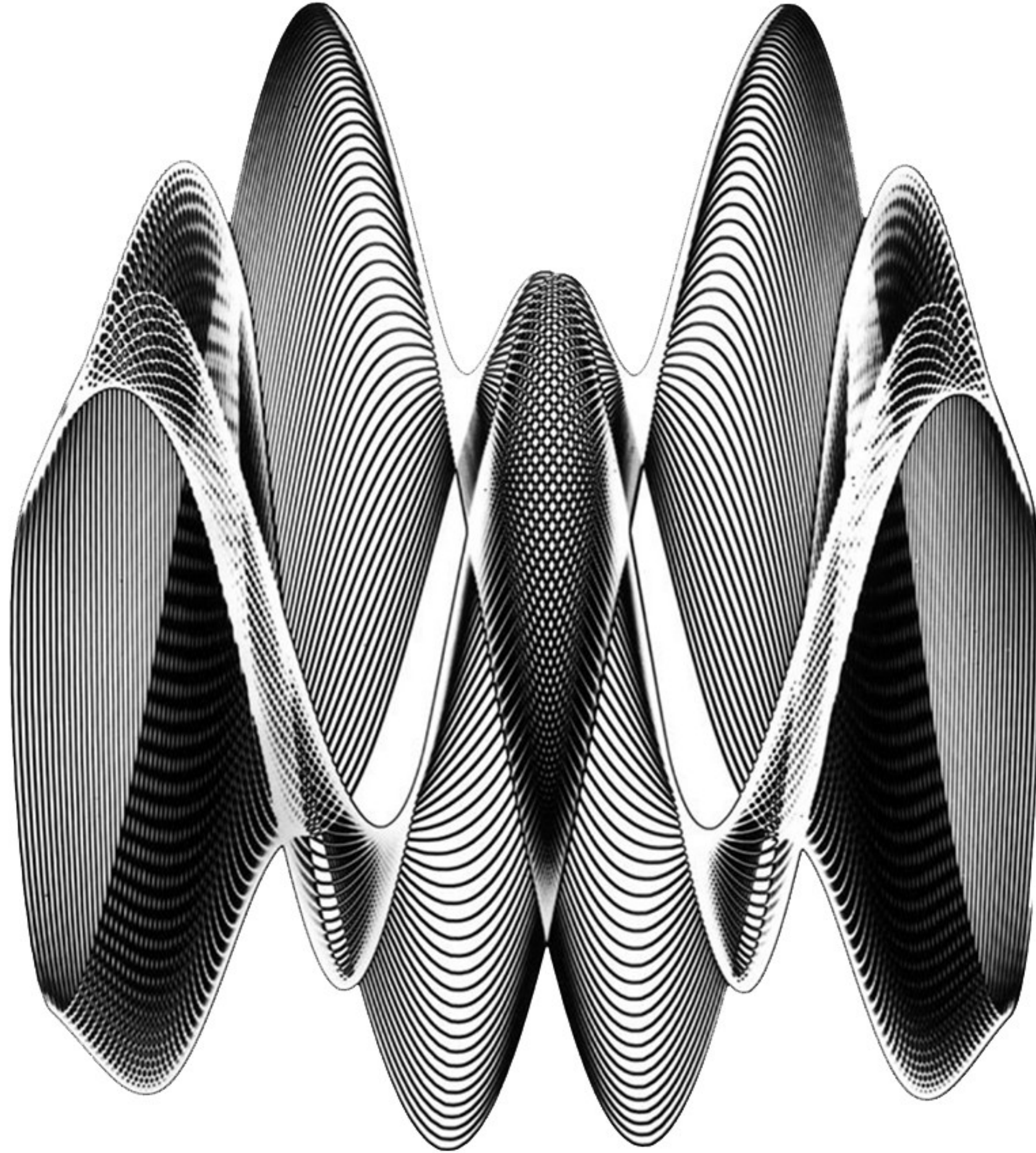
Heinrich Heidersberger

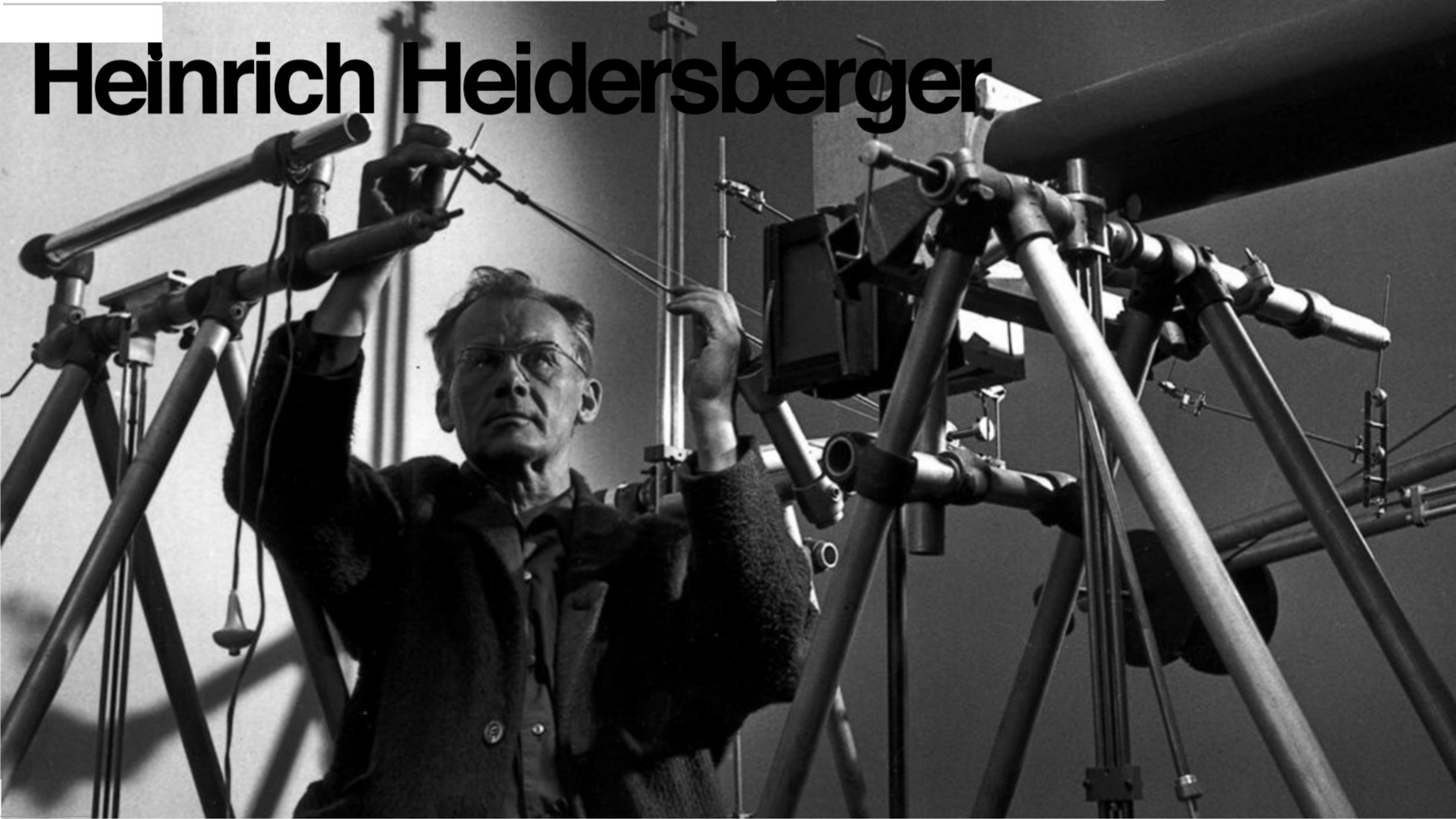


Heinrich Heidersberger



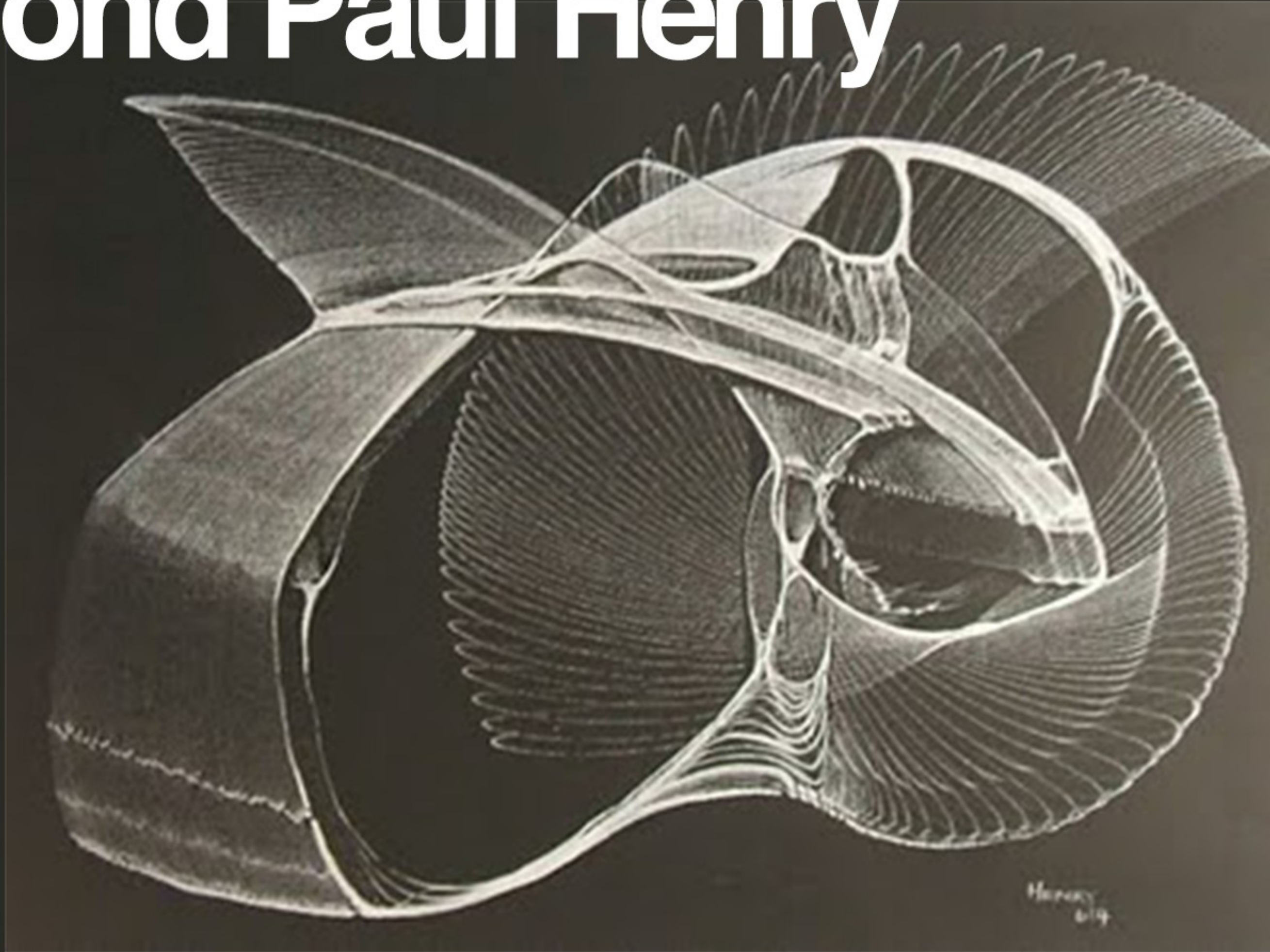
Heinrich Heidersberger





Heinrich Heidersberger

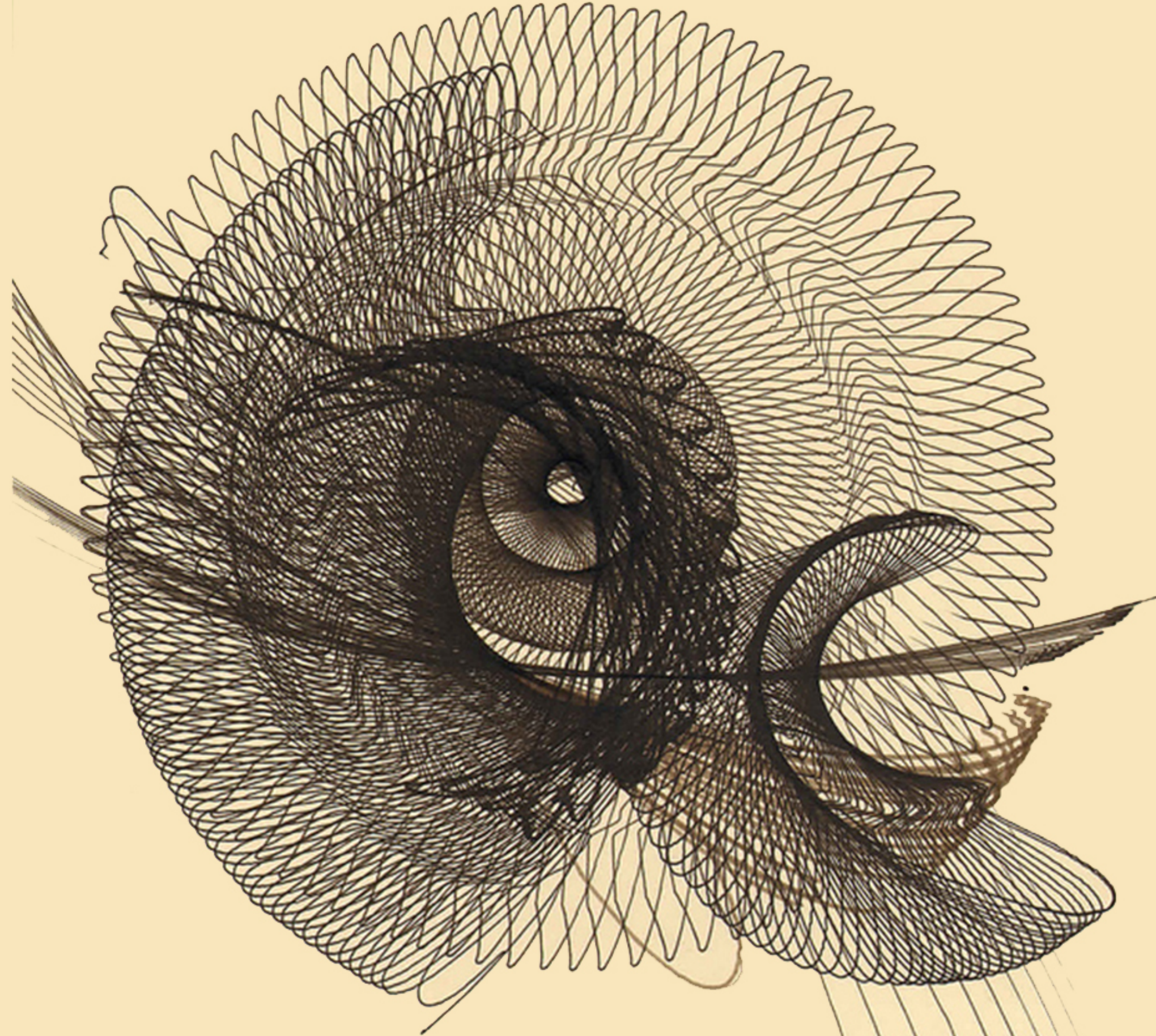
Desmond Paul Henry



Desmond Paul Henry

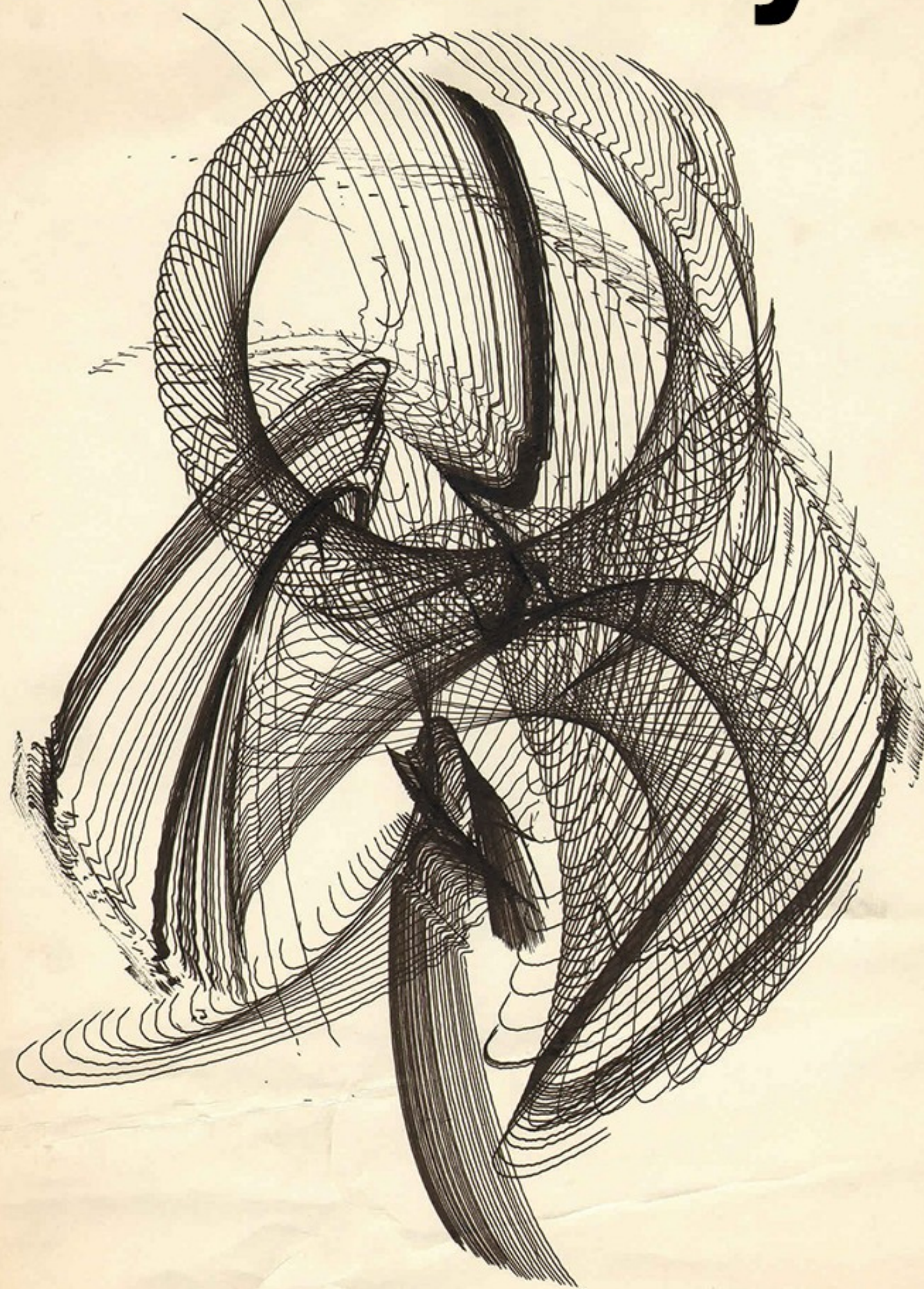


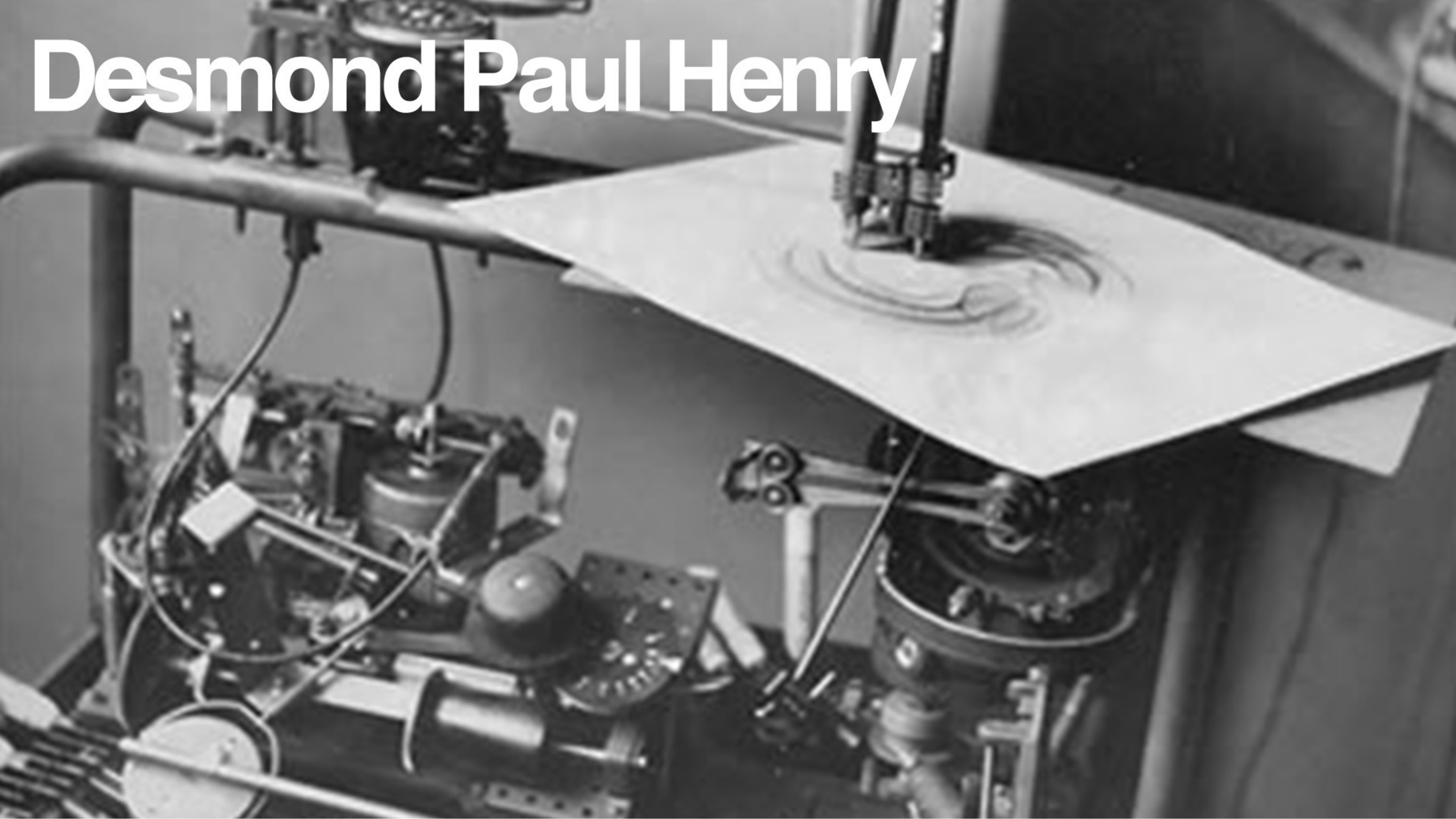
Desmond Paul Henry



HENRY 65

Desmond Paul Henry





Desmond Paul Henry

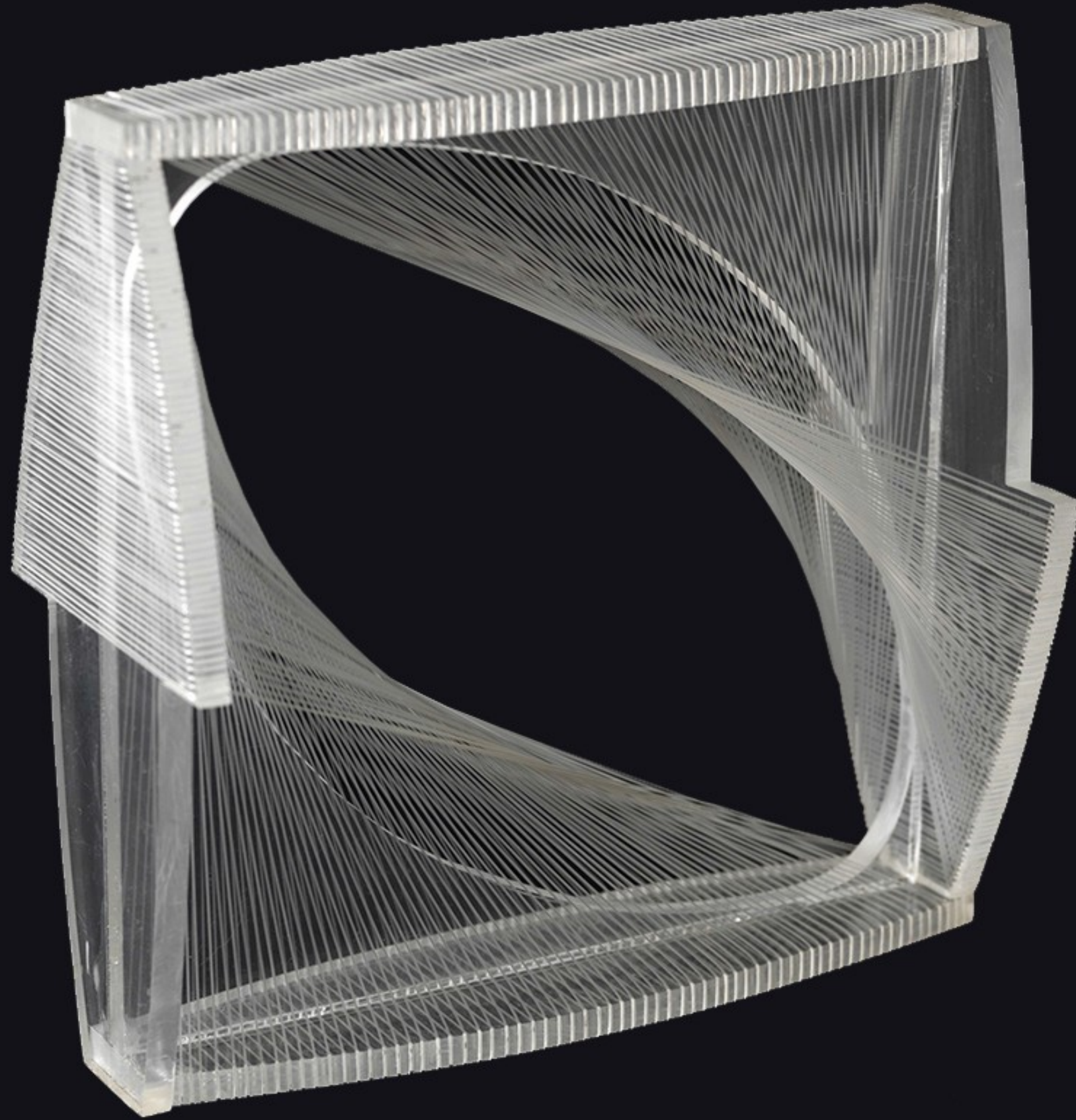
Dr Jack Citron



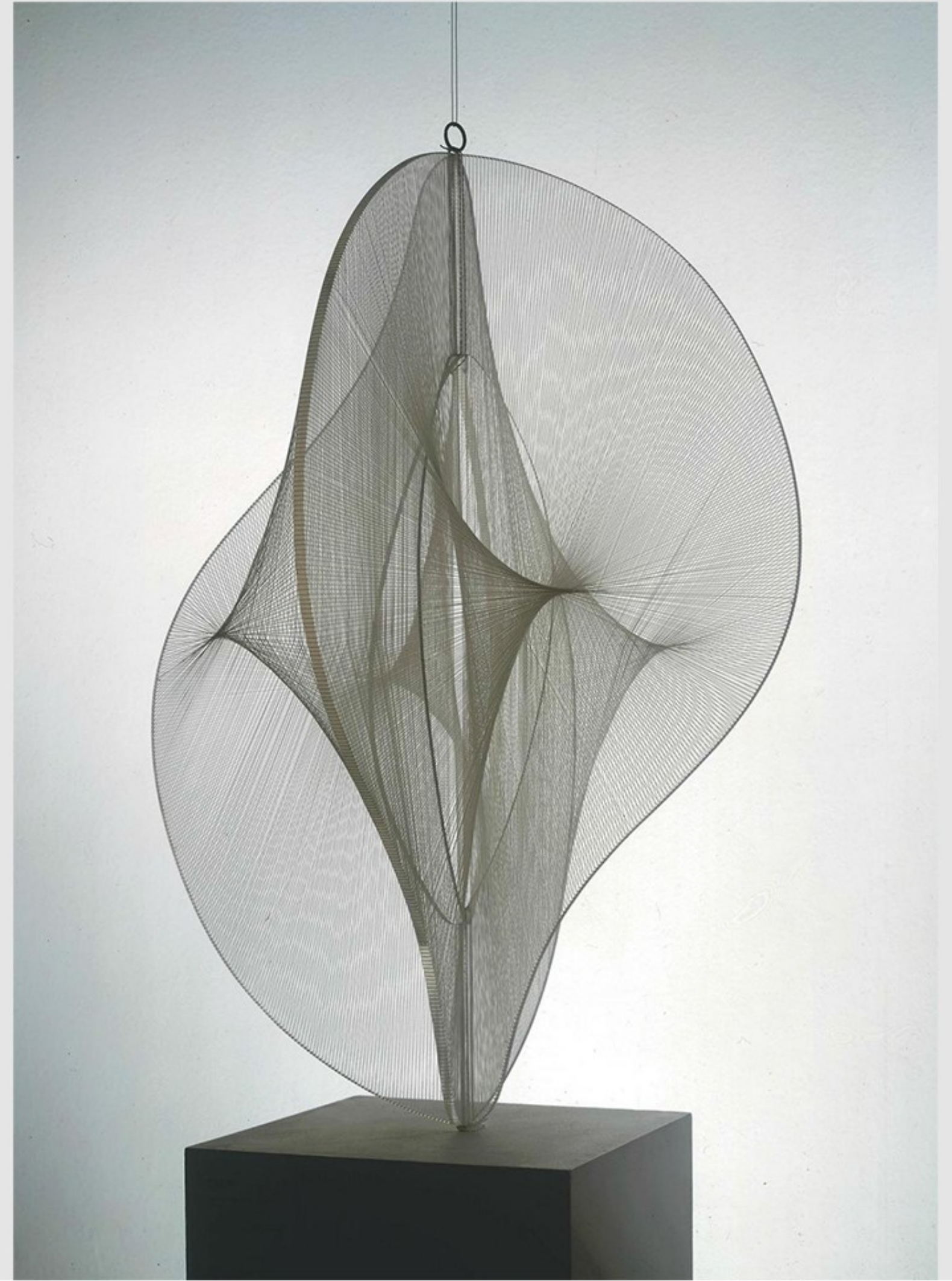
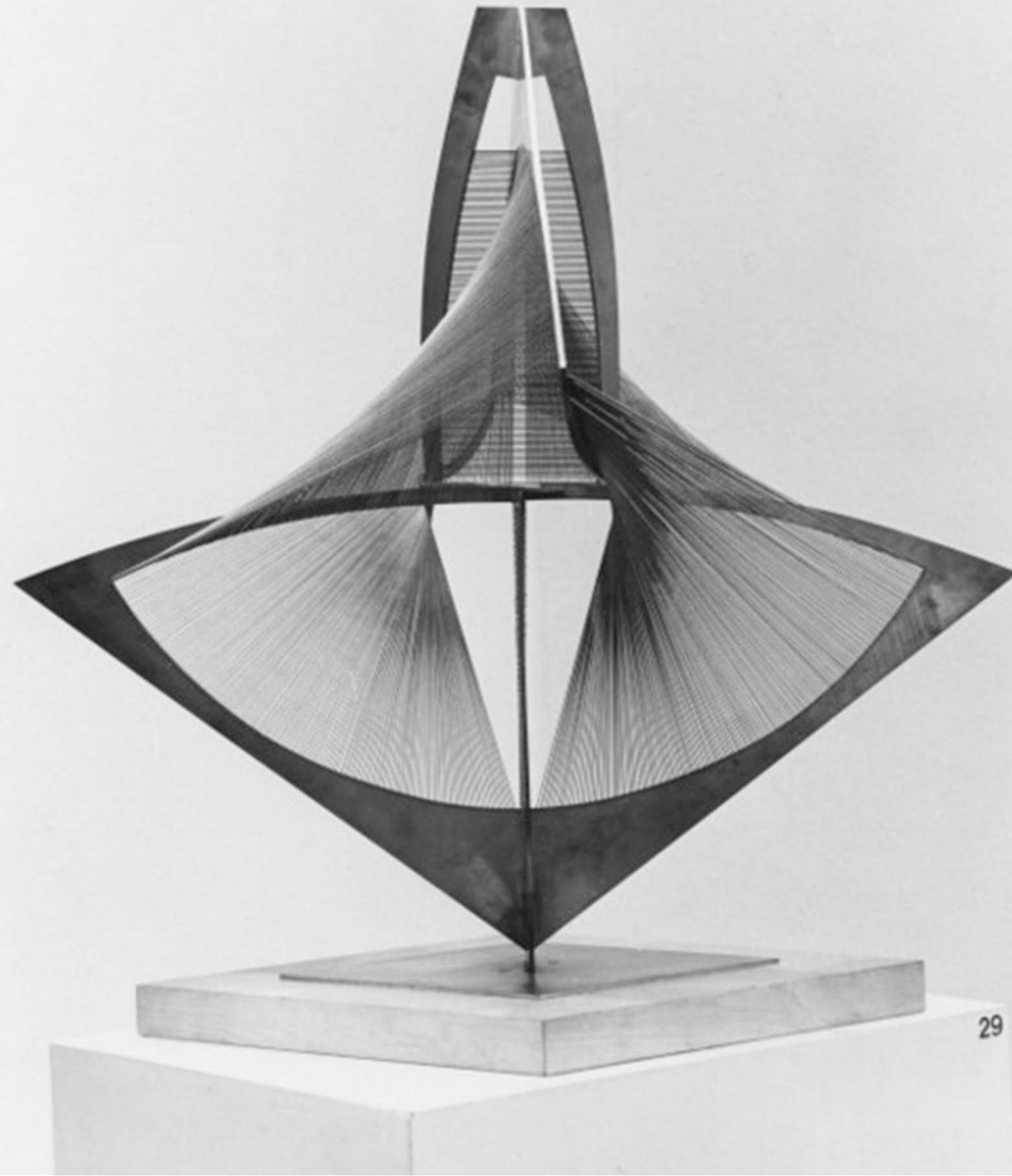
**Arts and culture
influences
1940s -> 1960/70s**



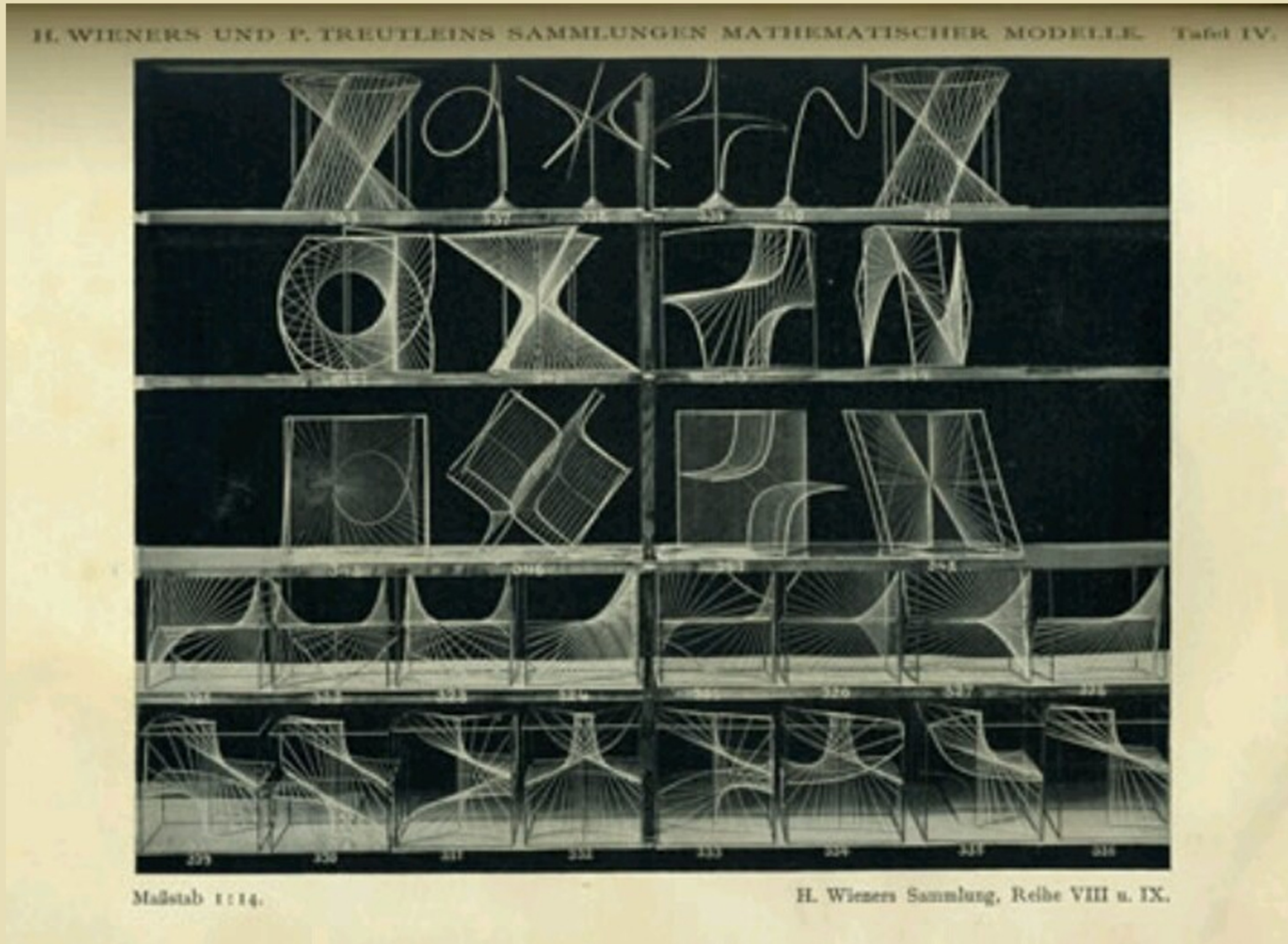
Naum Gabo



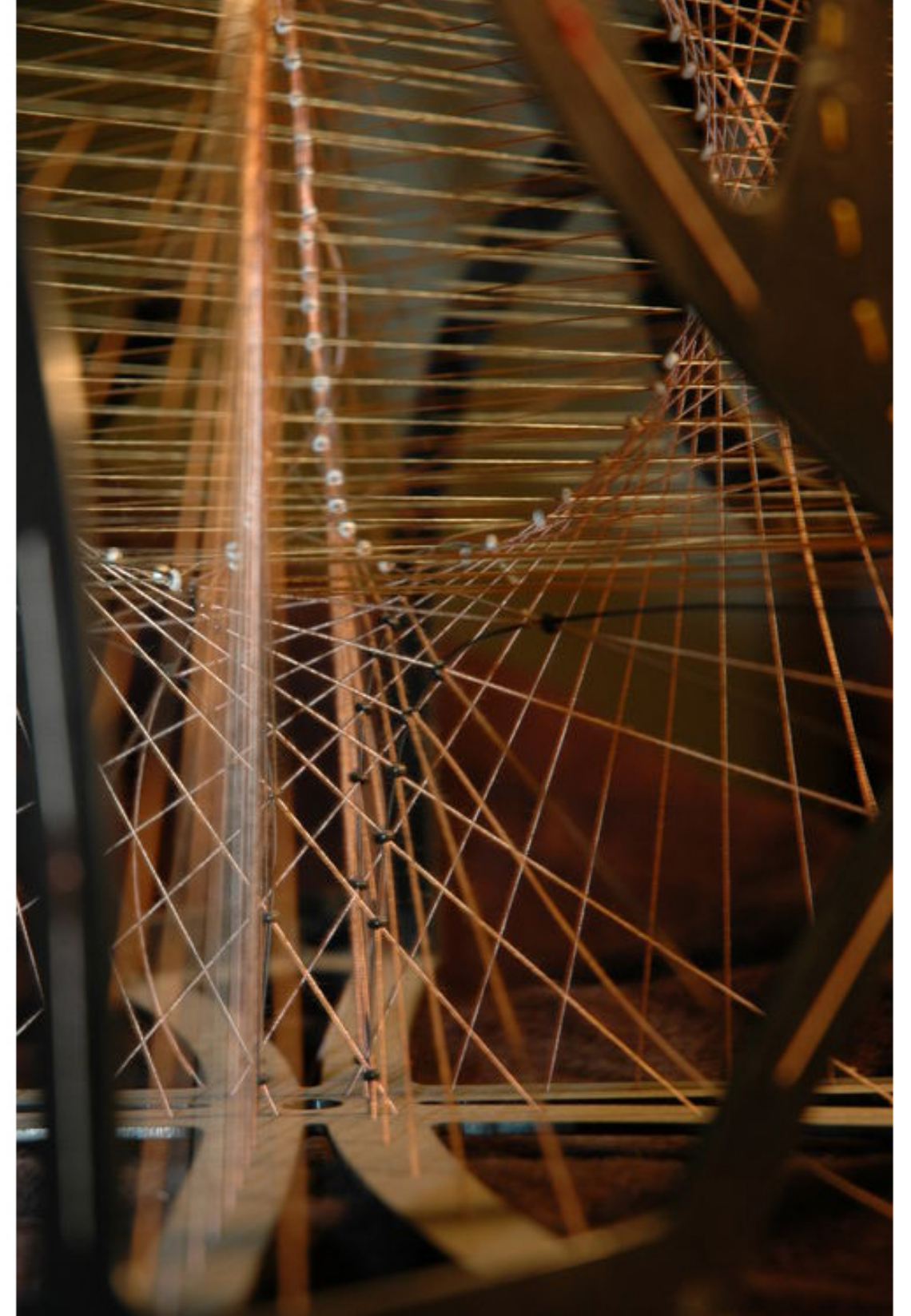
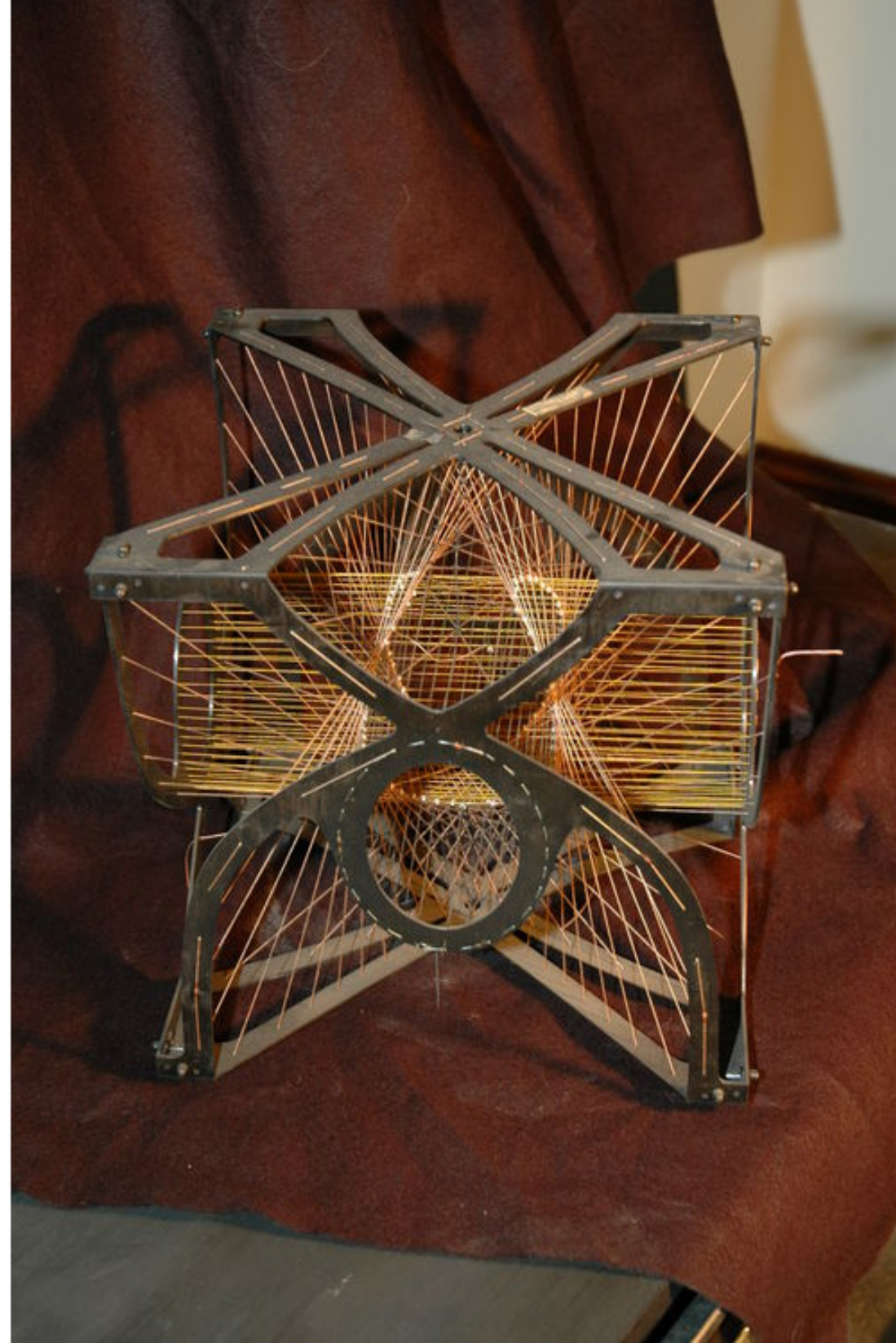
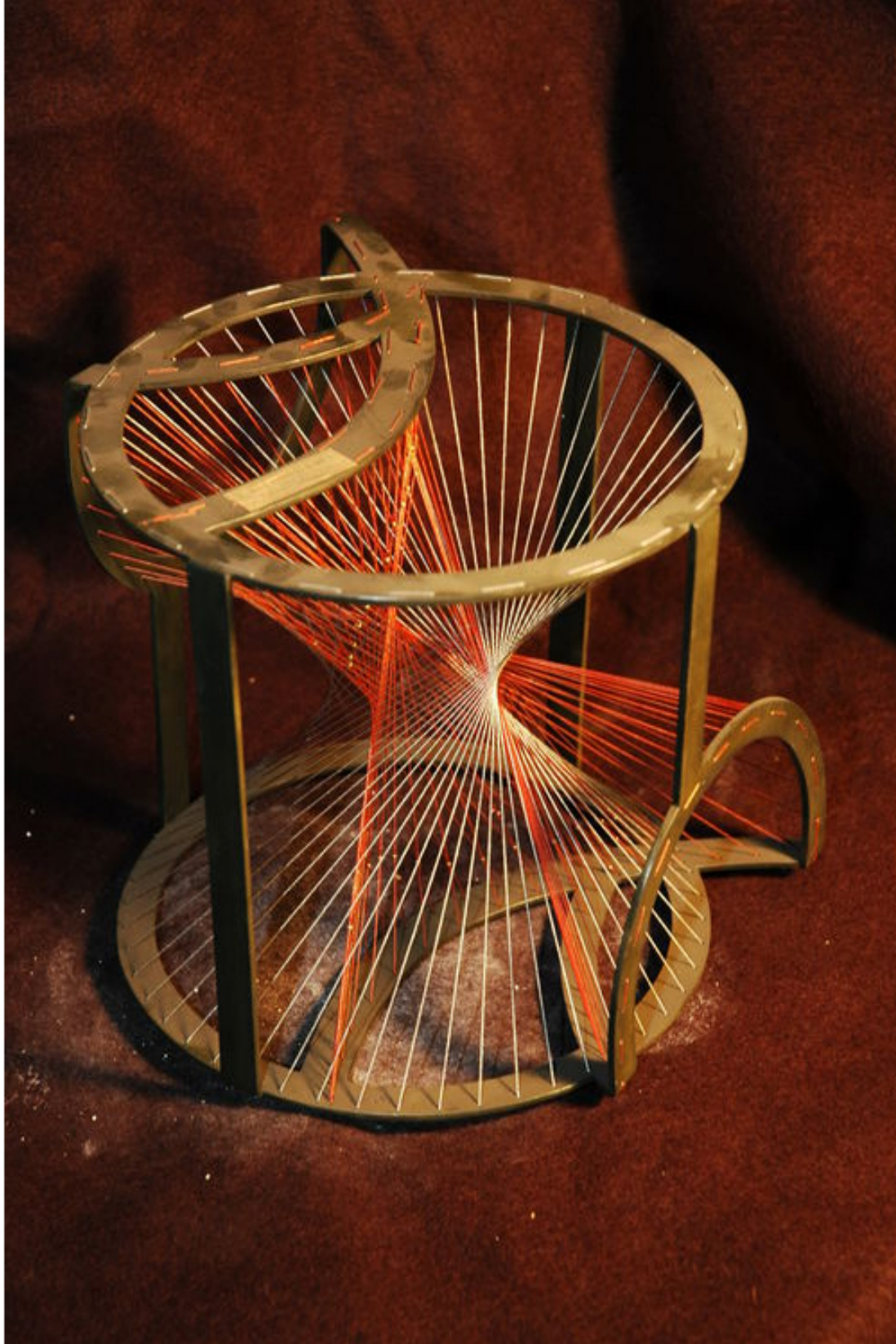
Naum Gabo



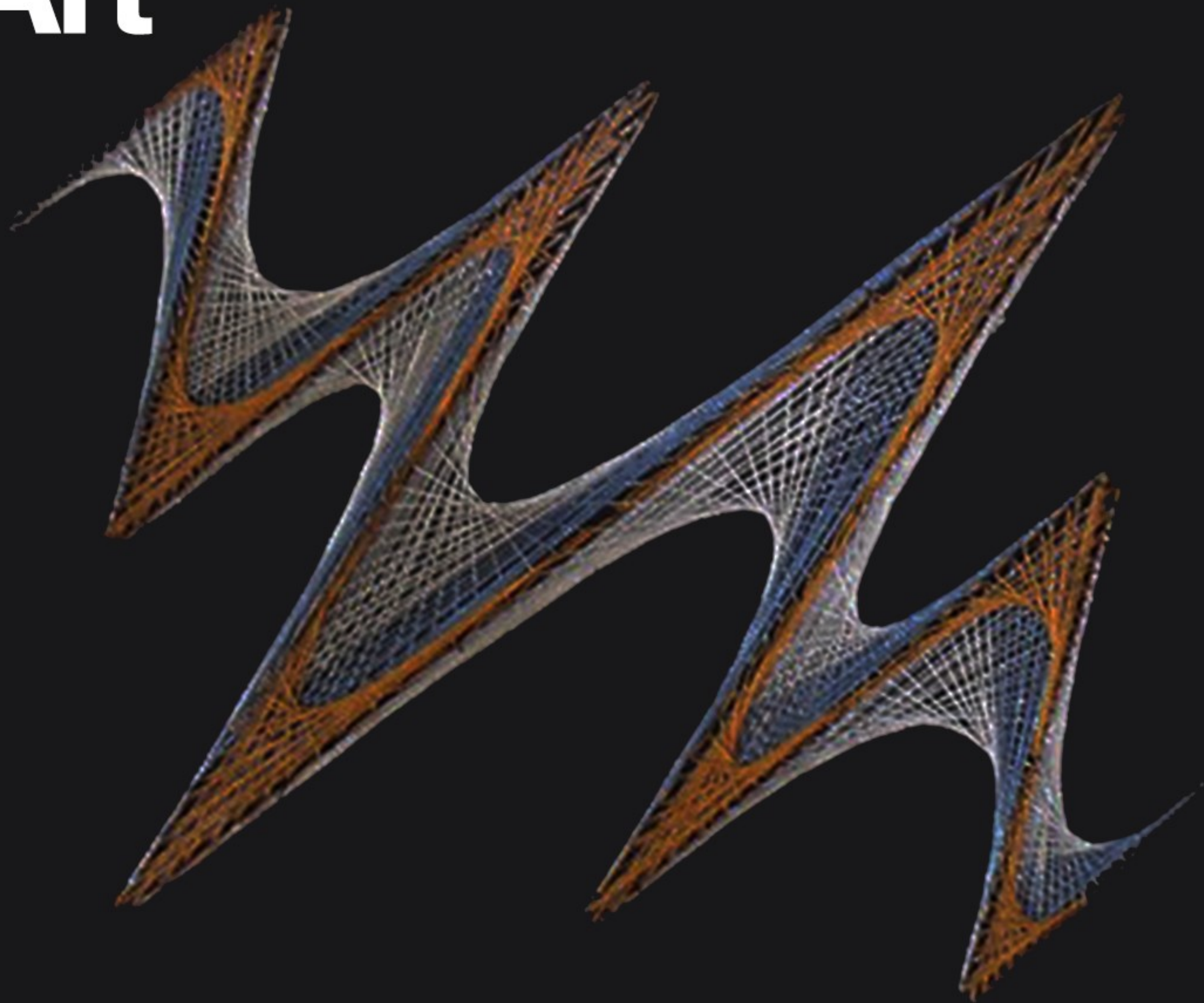
Mathematical objects



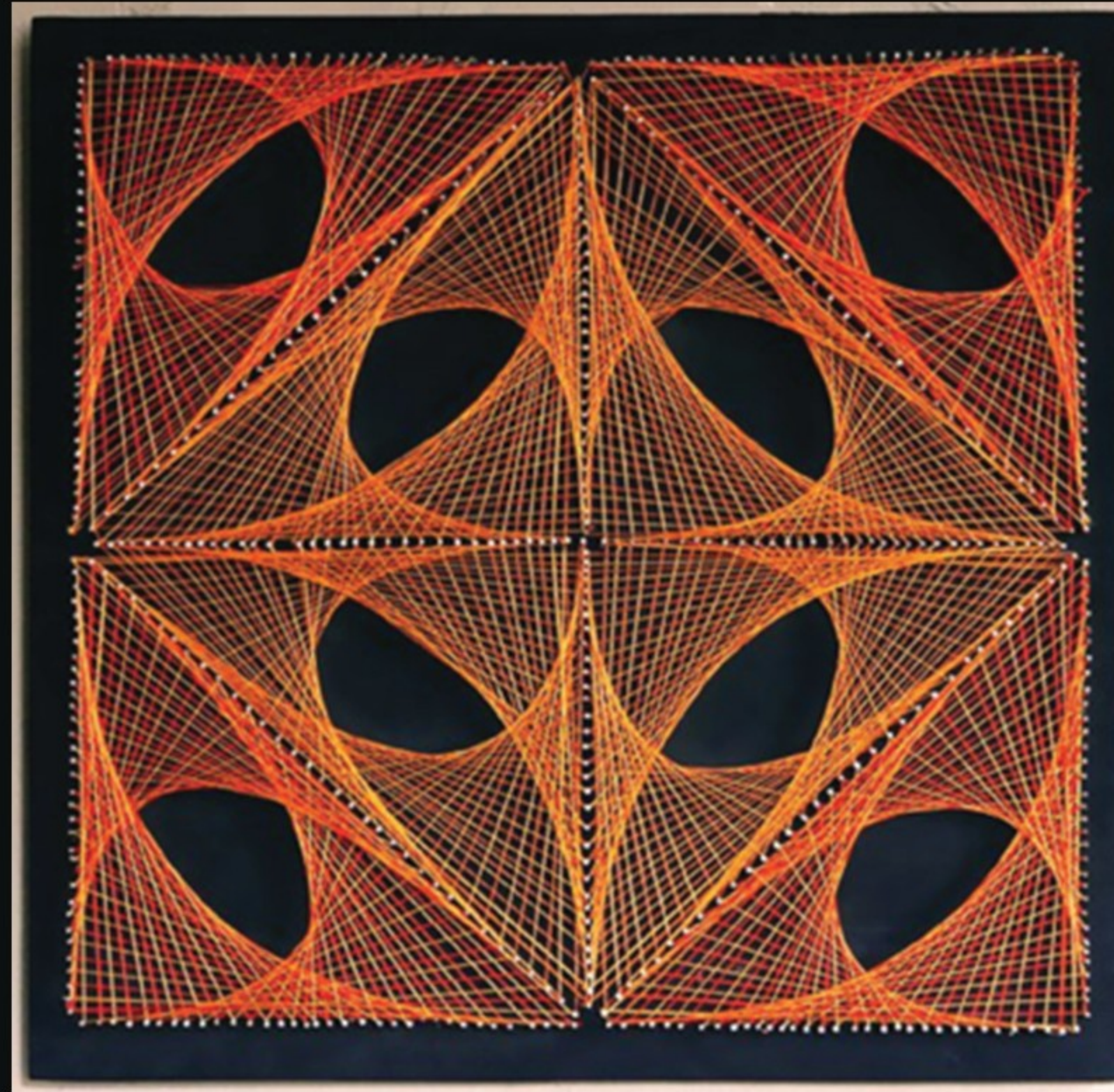
Mathematical objects



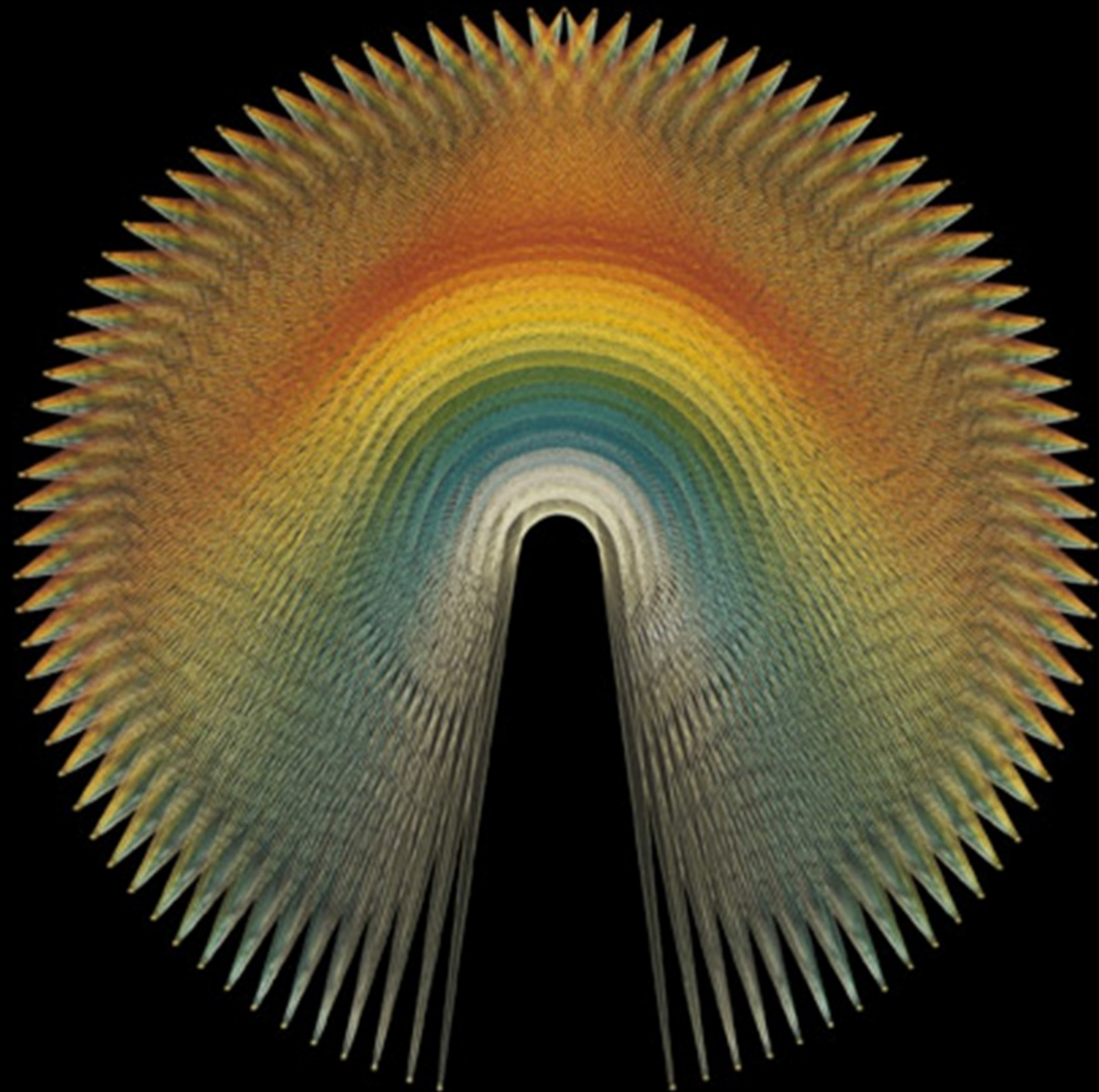
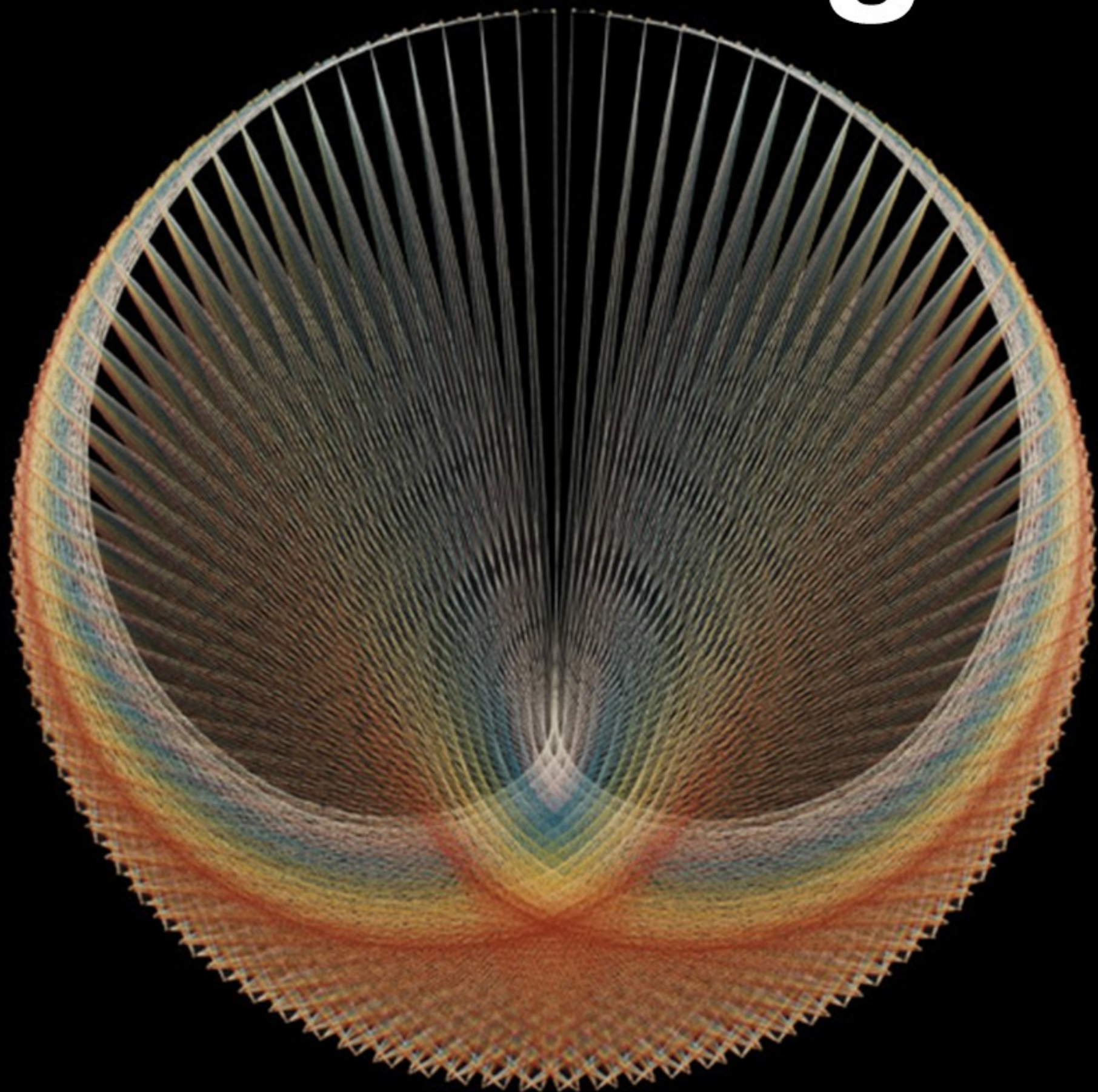
String Art



String Art



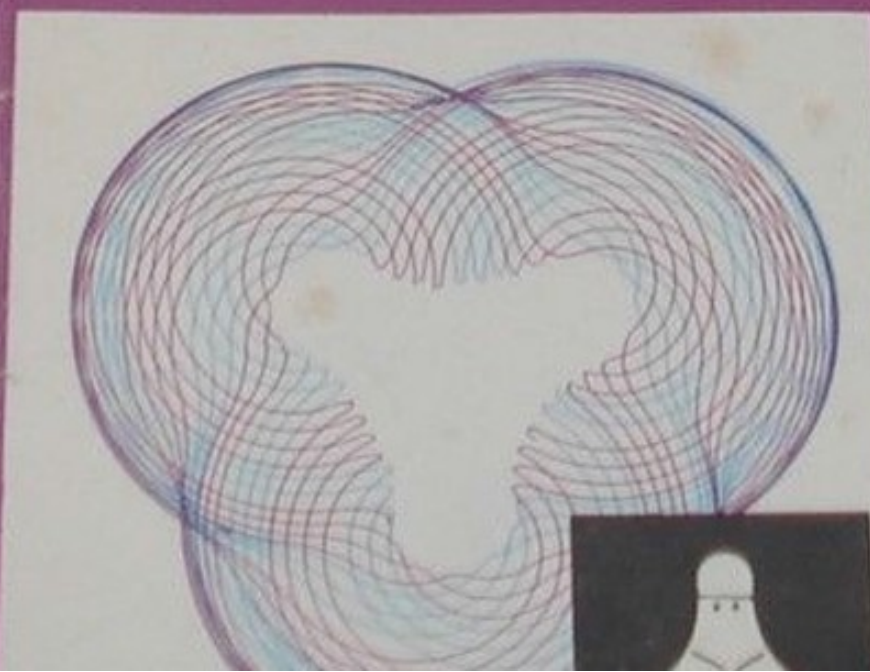
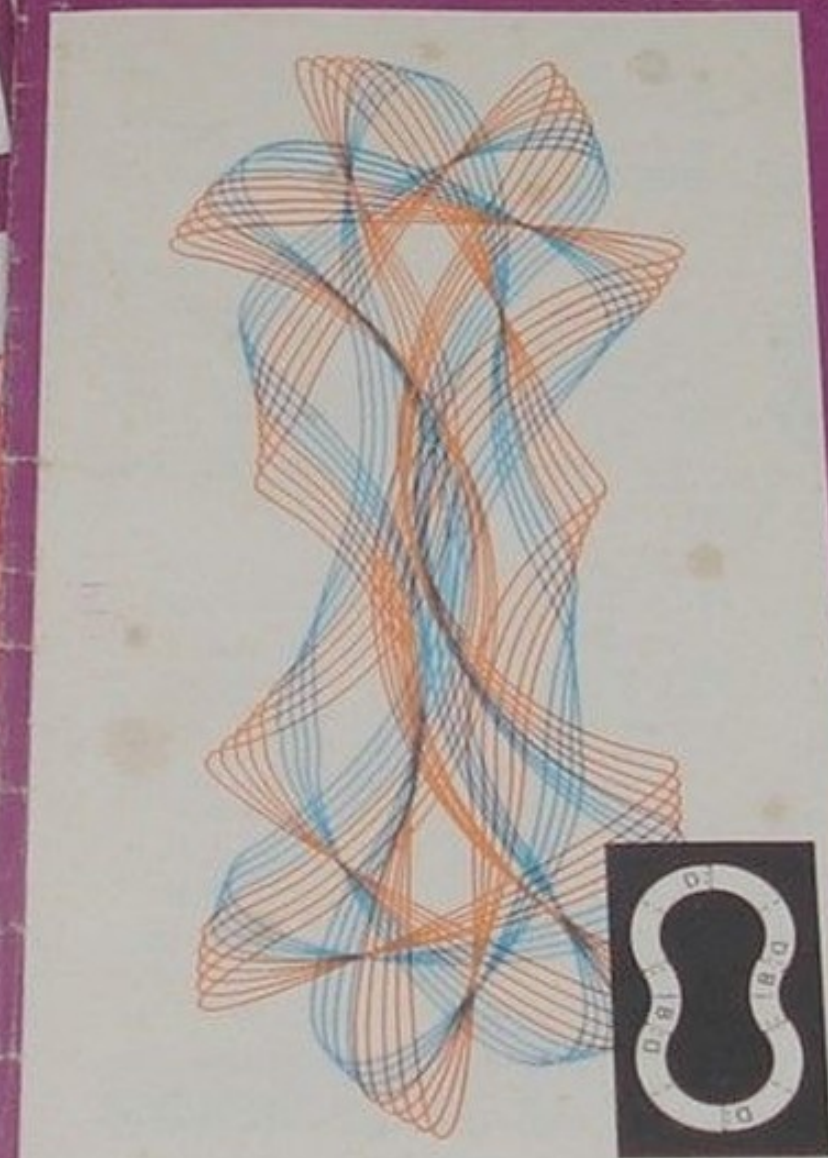
John Eichinger



ing paper and base board for
ER SPIROGRAPH

How to draw with

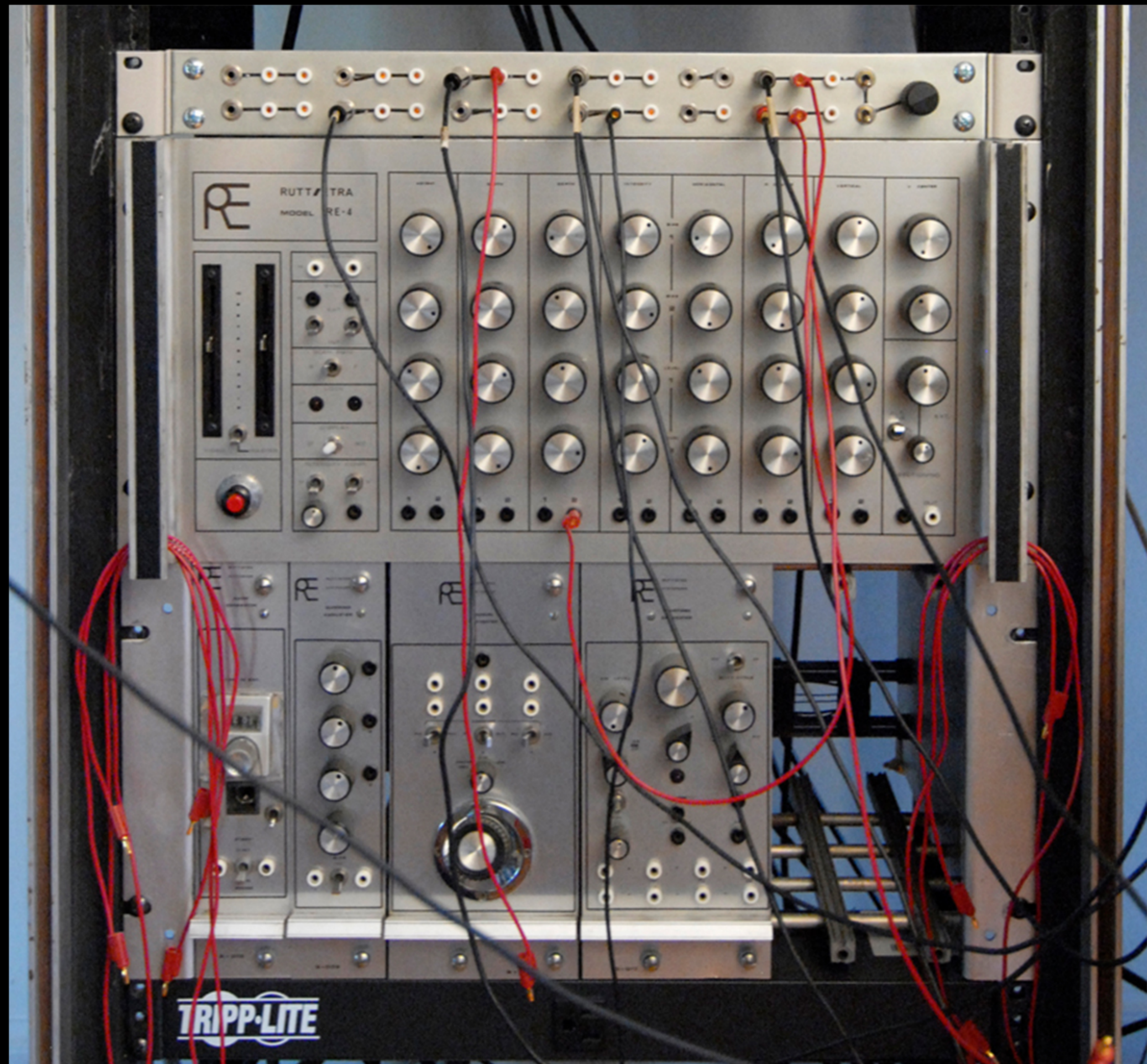
***SUPER* SPIROGRAPH**



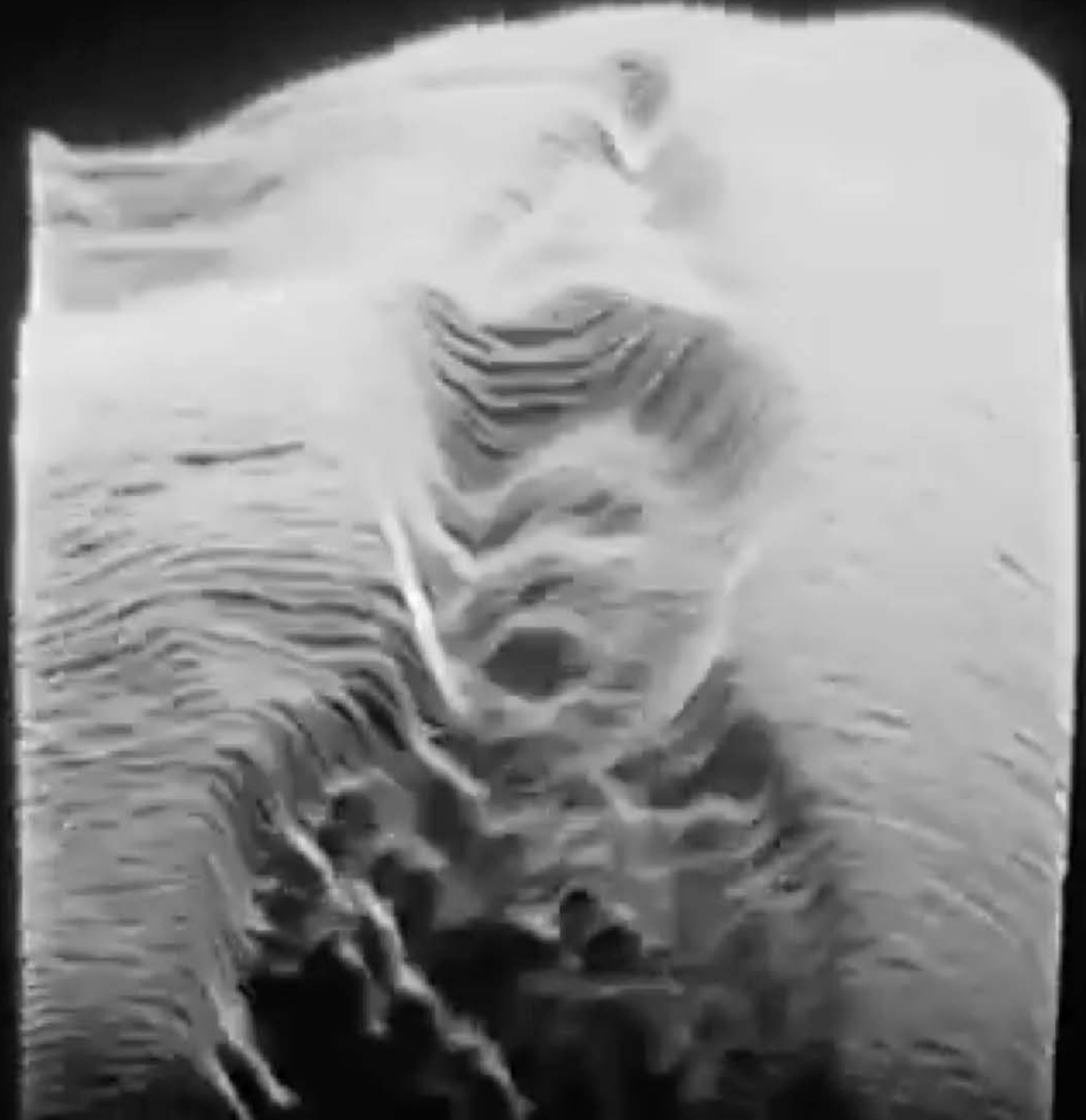
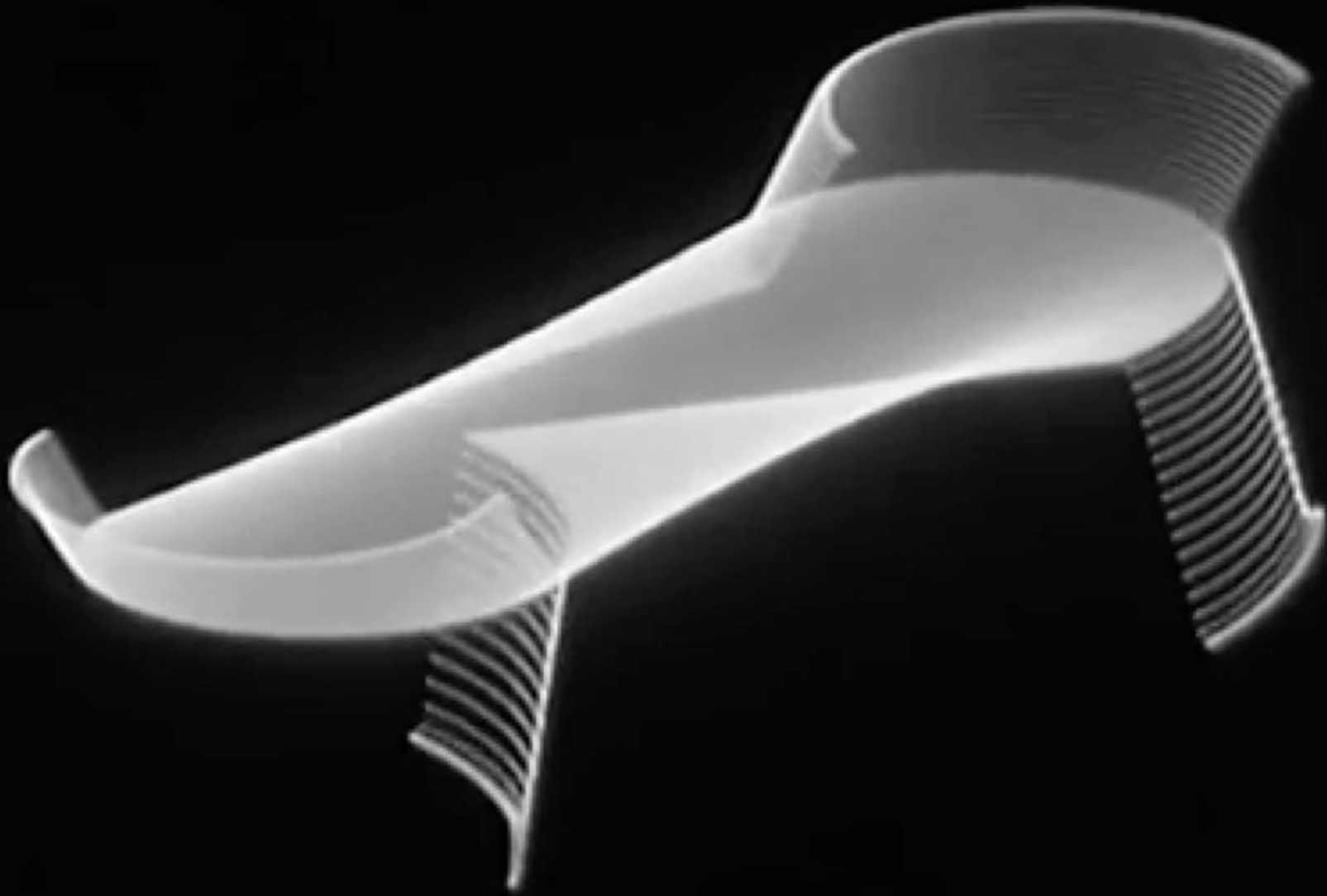
Bill Etra



Rutt/Etra (video synth)

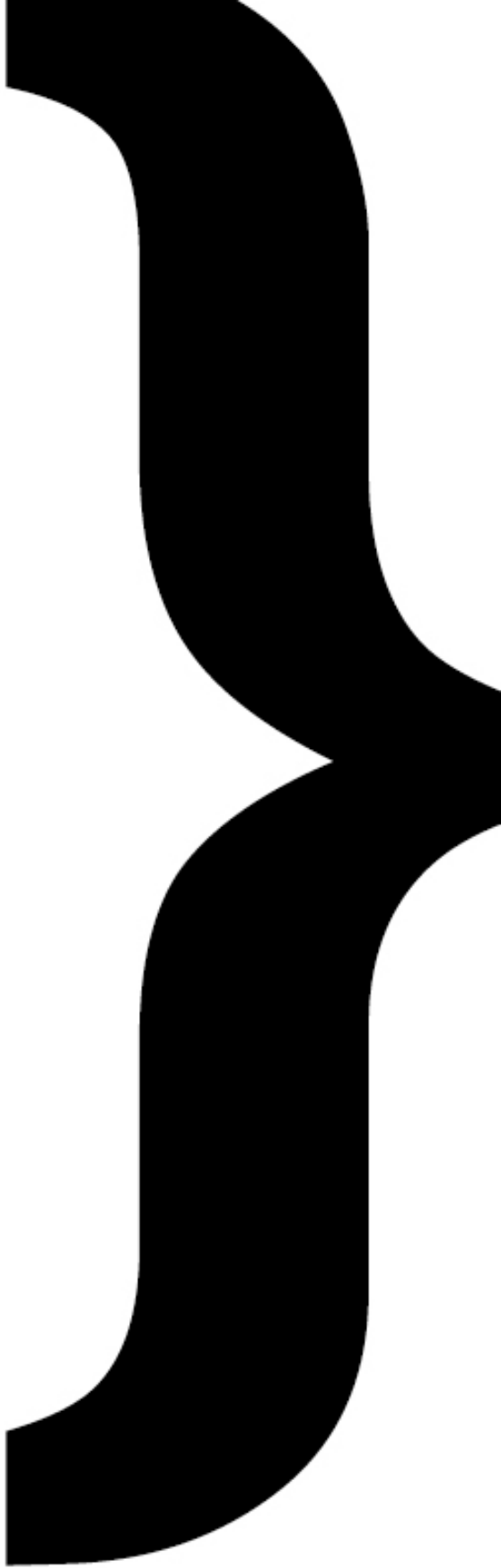


Woody Vasulka



Scan Processor Studies

**Current experimenters
& practitioners
2010+**



Kyle Evans



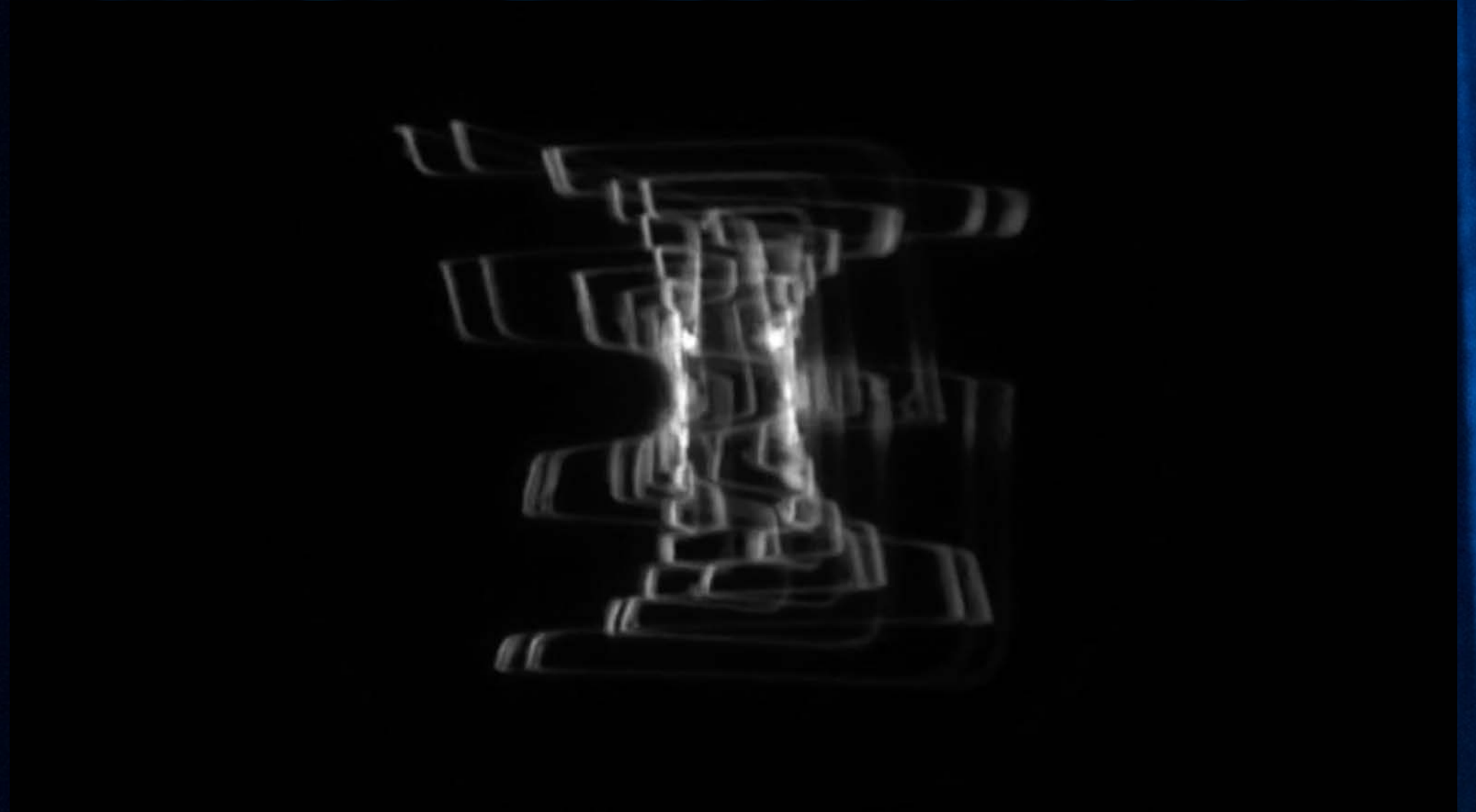
de/Rastra

Gary Hill



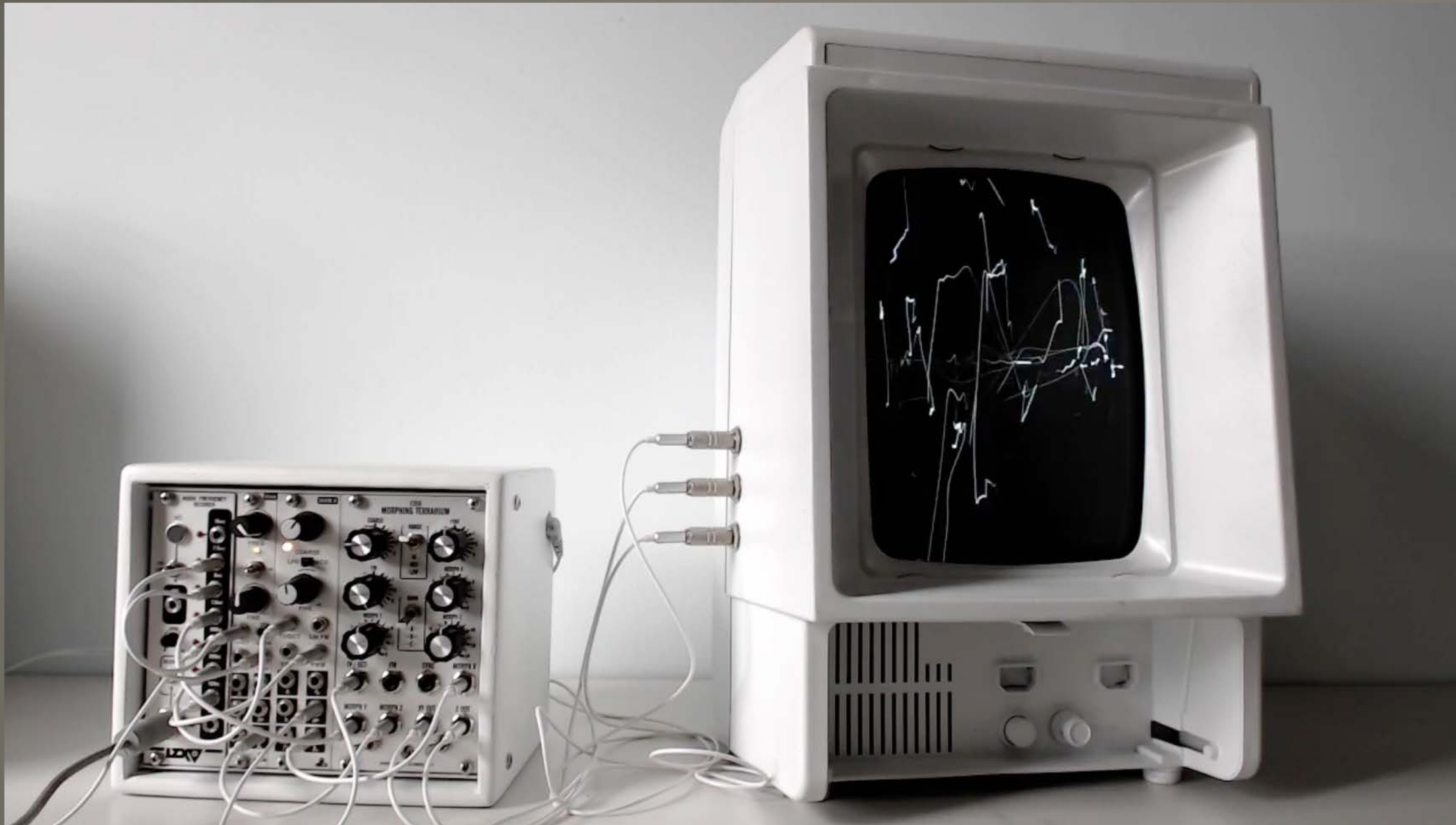
Deflection drawings

Mark Lyken



Oscillon Response

Benton C. Bainbridge



Lisa Joy

Nathan Thompson



Roland Lioni



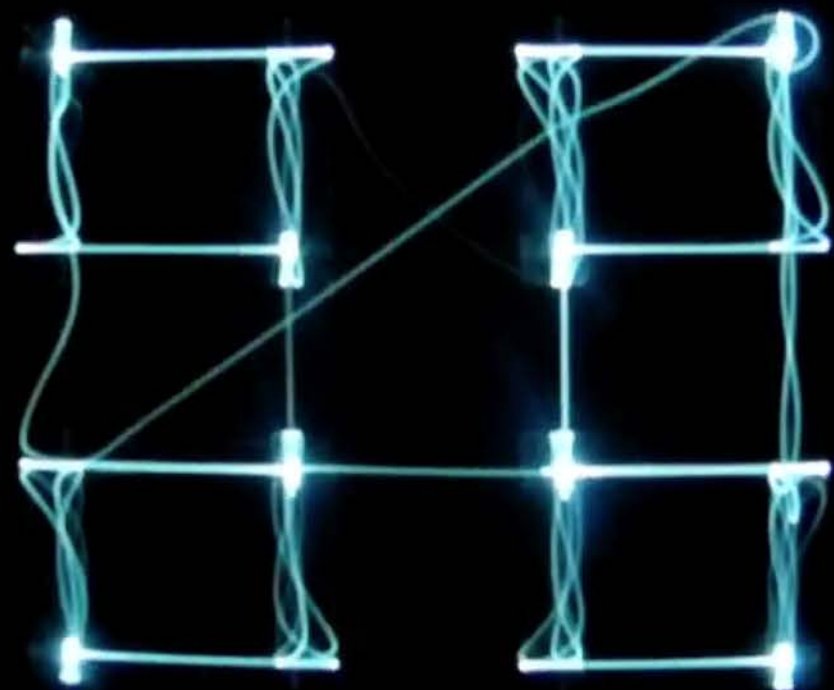
Roland Lioni



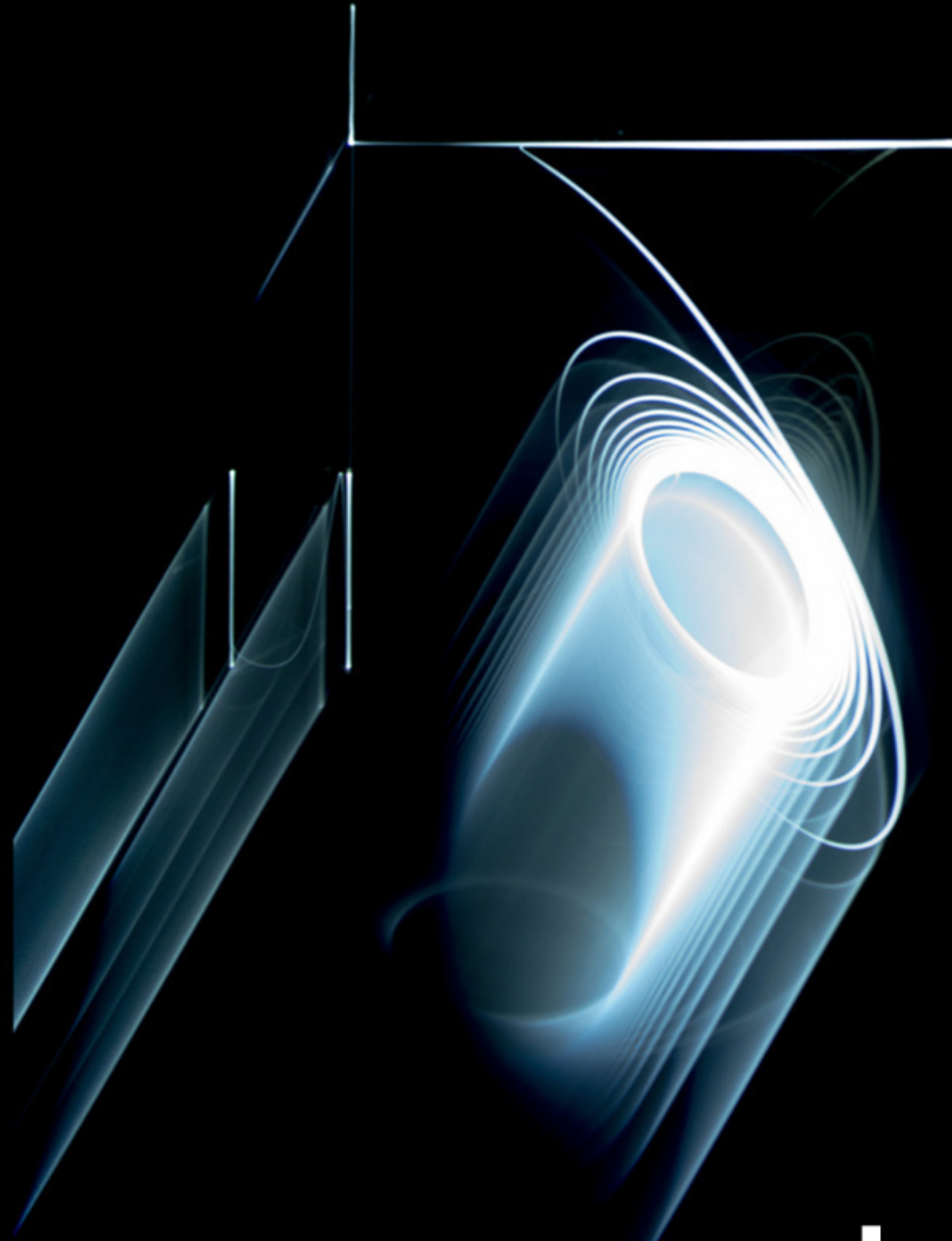
Joseph Hyde



Alberto Novell



Jeannot Quenson



www.jeannotquenson.com

Jeannot Quenson

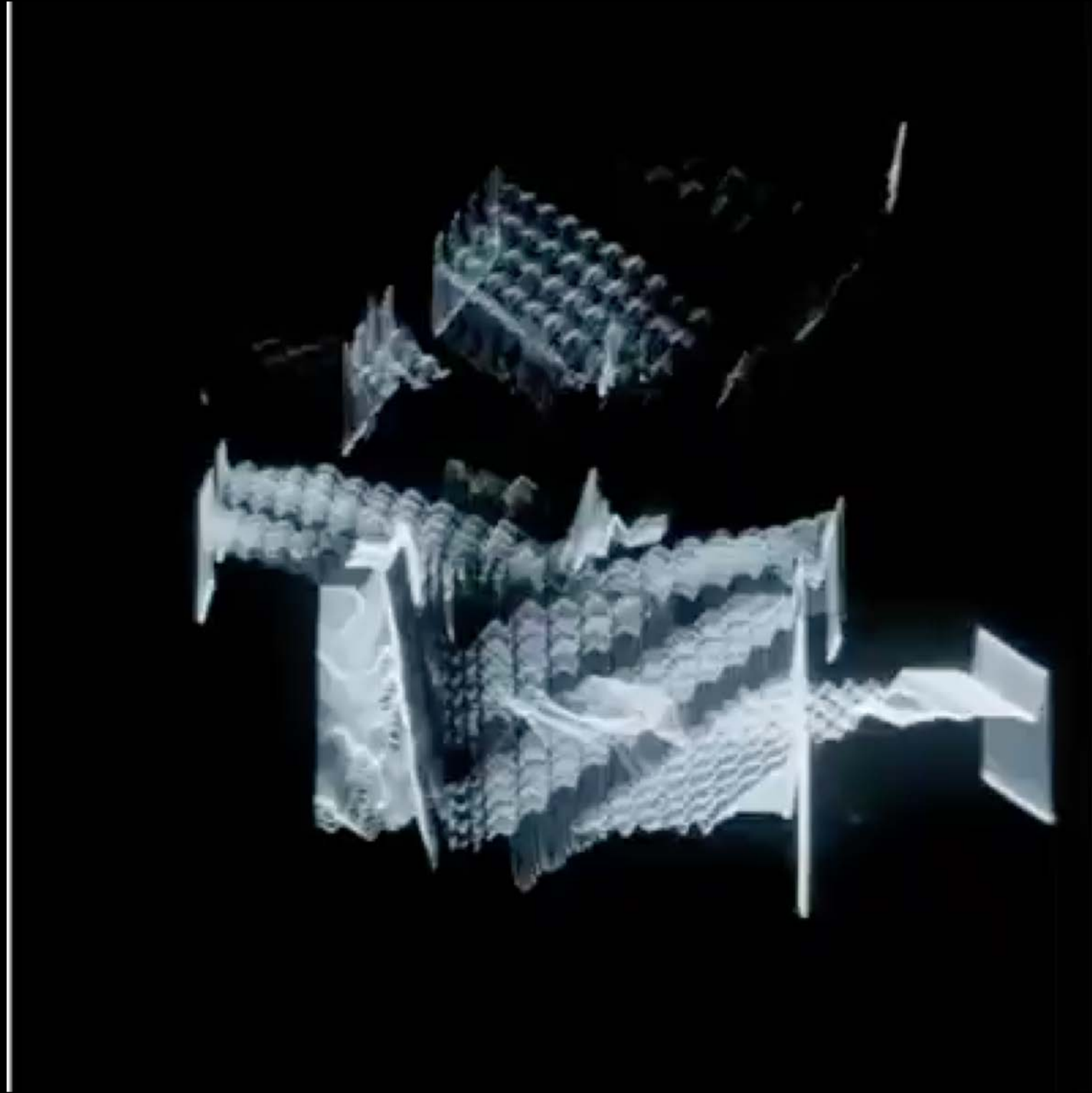


www.jeannotquenson.com

Jonas Bers



Philip Baljeu



Derek Holzer



Derek Holzer







Subject to Gestures

Subject to Gestures



BAFF/AA AND LBC DO

Subject to Gestures

Subject to Gestures is an online
platform for artists to share
their work and connect with
other artists.

Subject to Gestures is an online
platform for artists to share
their work and connect with
other artists.

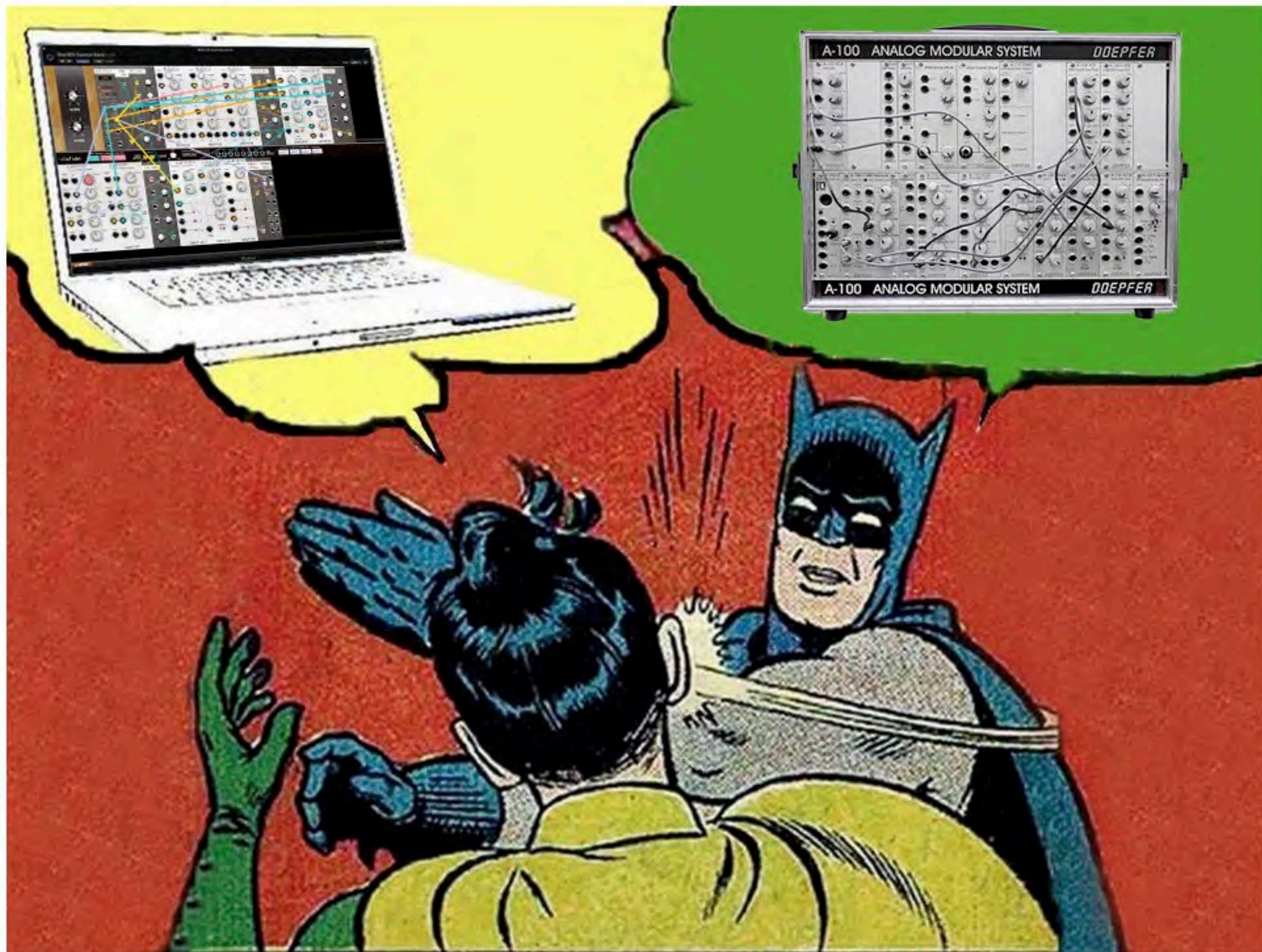


Subject to Gestures is an online
platform for artists to share
their work and connect with
other artists.

Subject to Gestures is an online
platform for artists to share
their work and connect with
other artists.

summoning beings from the Vectrex dimension





Thank you

[instagram.com/allthesixes666](https://www.instagram.com/allthesixes666)

andrew-duff.co.uk

youtube: halfofmeis333

@brightonmodular

brightonmodularmeet.co.uk