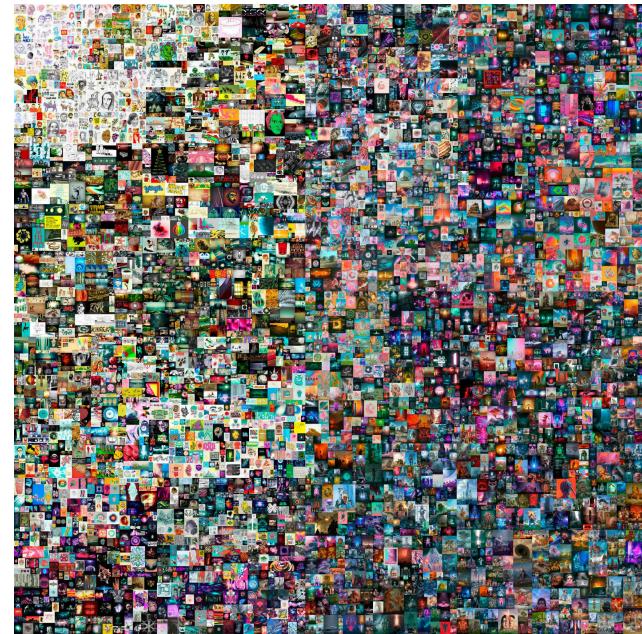
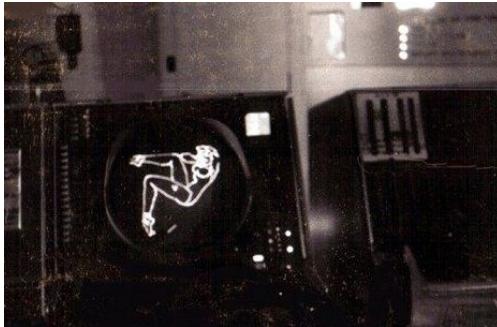


# La programmARTion

Et le live-coding

# Art et ordi vous avez dit ?

- Depuis que l'ordi existe, on fait de l'art dessus
- Petit cours d'histoire accéléré, on va parler des débuts



# Histoire (depuis quand on fait de l'art informatique ?)



Figures géométriques islamiques

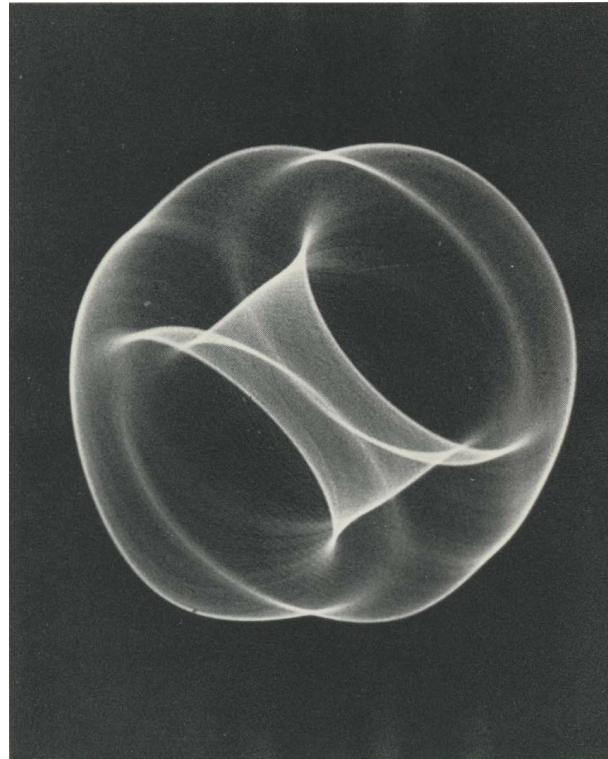


La bataille de San Romano (c. 1435–1460), Paolo Uccello

# Les balbutiements



Ben Laposky



Oscillon 40, 1952

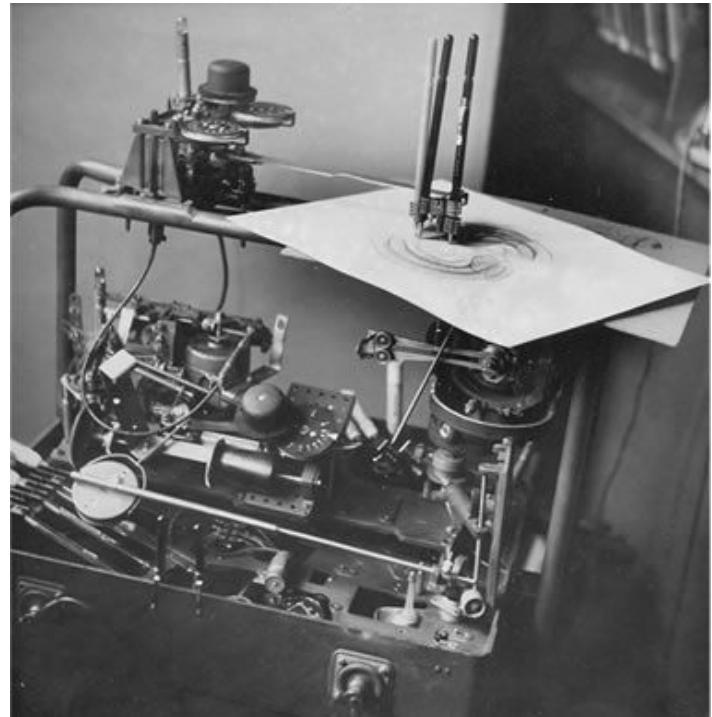
# SAGE



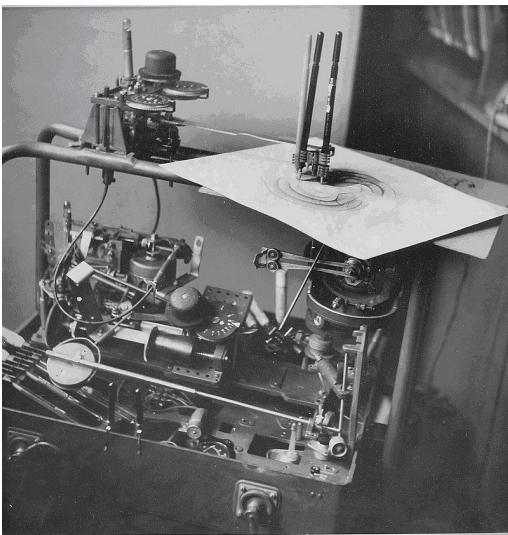
Lawrence A. Tipton, pin-up girl 1956



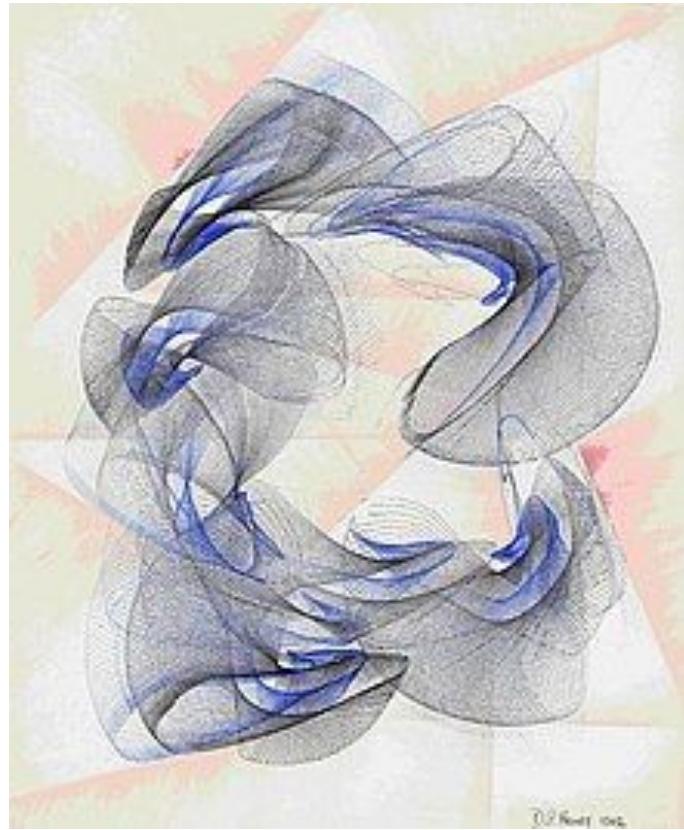
# Desmond P. Henry, le hacker



# Histoire

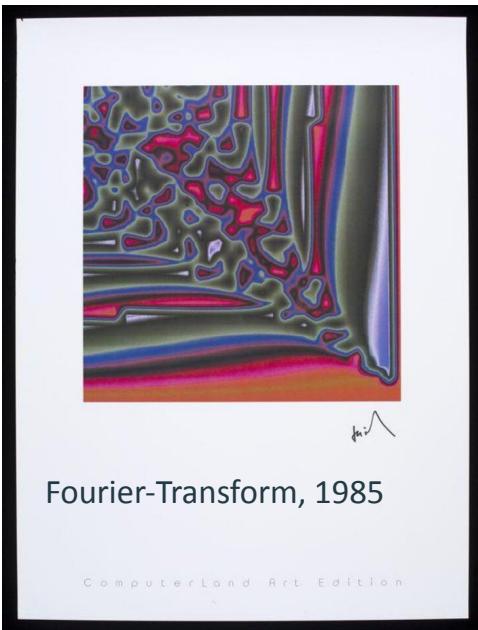


Desmond Paul Henry, Picture by Drawing Machine 1, c. 1962



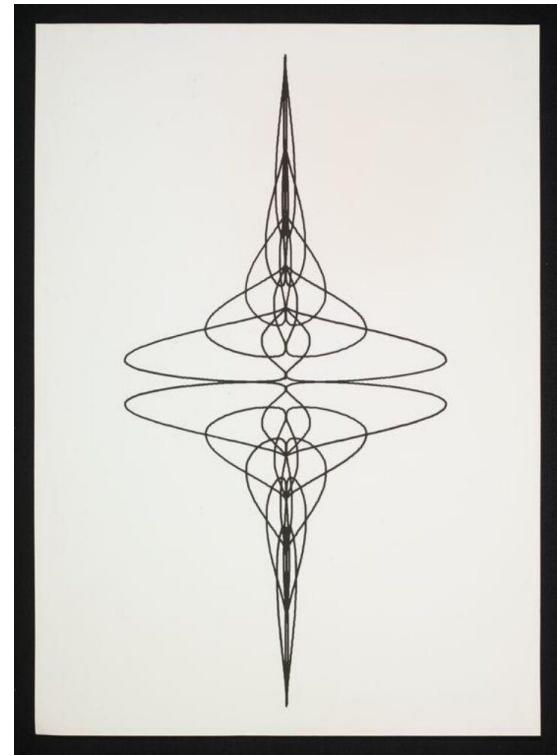
# Mentions Honorables

## Herbert W. Franke



Fourier-Transform, 1985

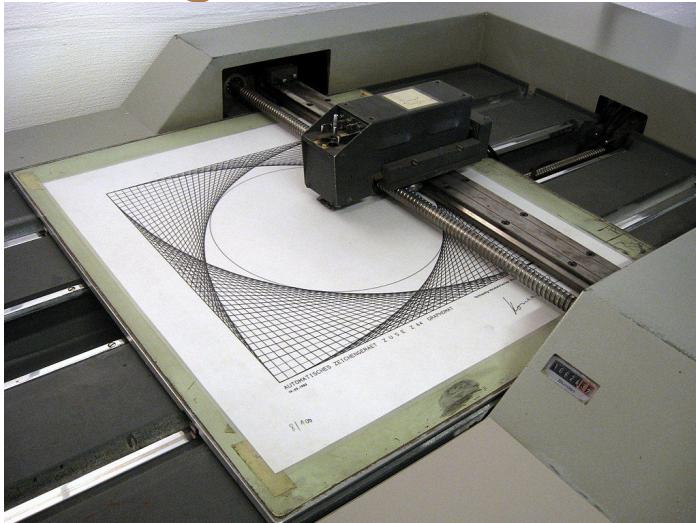
ComputerLand Art Edition



KAES 1 (Algebraic Curves), 1970

# Mentions Honorables

## Georg Nees



Zuse Z64 traceur



Georg Nees, Untitled, 1970

Et la musique dans tout ça? Le premier son



CSIRAC, 1951

# MUSIC-N by Max Matthews



# Première compo: Illiac Suite (1957)

## I. EXPERIMENT NO. I

L.A. HILLER, JR. AND L.M. ISAACSON

PRESTO

The musical score consists of four staves: Violin I, Violin II, Viola, and Cello. The tempo is marked as PRESTO. The score includes dynamic markings such as **f**, **p**, **ff**, and **pp**. Performance instructions include **sust.** above the first staff and **(A)** above the fourth staff. Measure numbers 10 and 30 are indicated. The instrumentation includes Violin I, Violin II, Viola, and Cello.

(A)

# John Cage dans le game: HPSCHD



# Fast-Forward les années 80-90

- Démocratisation de l'informatique au plus grand nombre
- Augmentation de la puissance de calcul
- Les gros artistes utilisent les technologies ( Andy Warhol)
- utilisation dans l'industrie (par ex Tron)
- création de nouvelles culture (demoscene)



Debbie Harry, Andy Warhol, 1985

# Aujourd’hui, l’IA



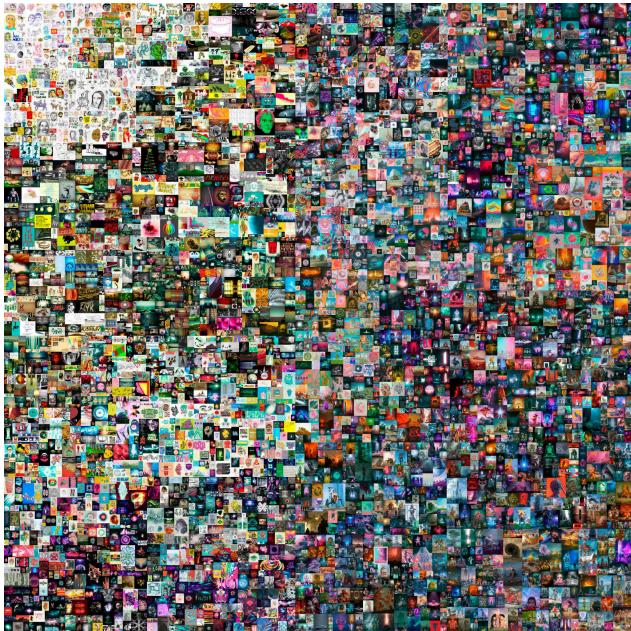
Jason M. Allen, Théâtre D'opéra Spatial, 2022

# AARON

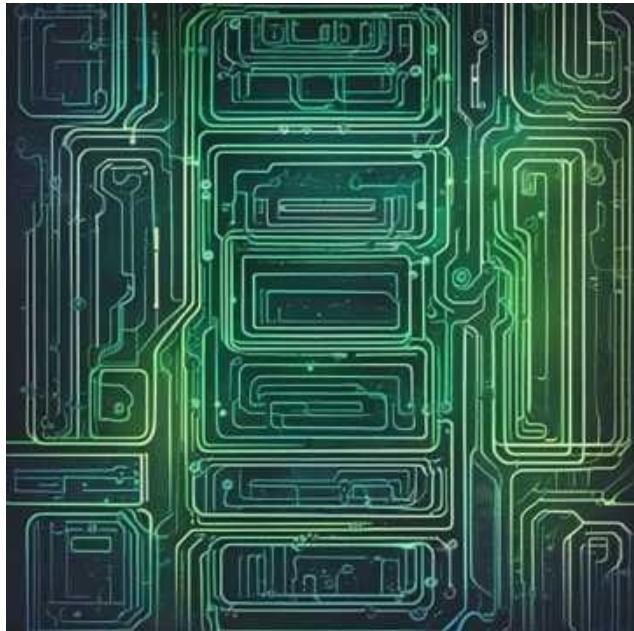
Harold Cohen

Untitled, 1977-1978





Peeble - The First 5000 days



Hackerspace ULB - SongGenerator.io

# Le live coding dans tout ça ?

## définition

Comme Wikipédia nous le dit:

“Le codage en direct [...] est une forme d'art du spectacle et une technique de créativité centrée sur l'écriture du code source et l'utilisation de la programmation interactive de manière improvisée.”

- Wikipédia



!=

LiveChat

LIVE CODING SESSION

## Build apps with LiveChat Design System

with Dominik Sławkowski  
and the Developer Program

9/16/21 5 pm CEST

A promotional graphic for a LiveChat session. It features a dark background with white and orange hand-drawn style illustrations of hands interacting with geometric shapes like triangles, rectangles, and circles. The text "LiveChat" is at the top left, followed by "LIVE CODING SESSION". The main title "Build apps with LiveChat Design System" is in large white letters. Below it, it says "with Dominik Sławkowski and the Developer Program". At the bottom right, there are two orange rounded rectangular boxes containing the date "9/16/21" and time "5 pm CEST".

# Le live coding dans tout ça ?

## Ligne du temps

1996 - SuperCollider & PureData (aka PD)

2002 (ou 3 ou 4) - ChucK

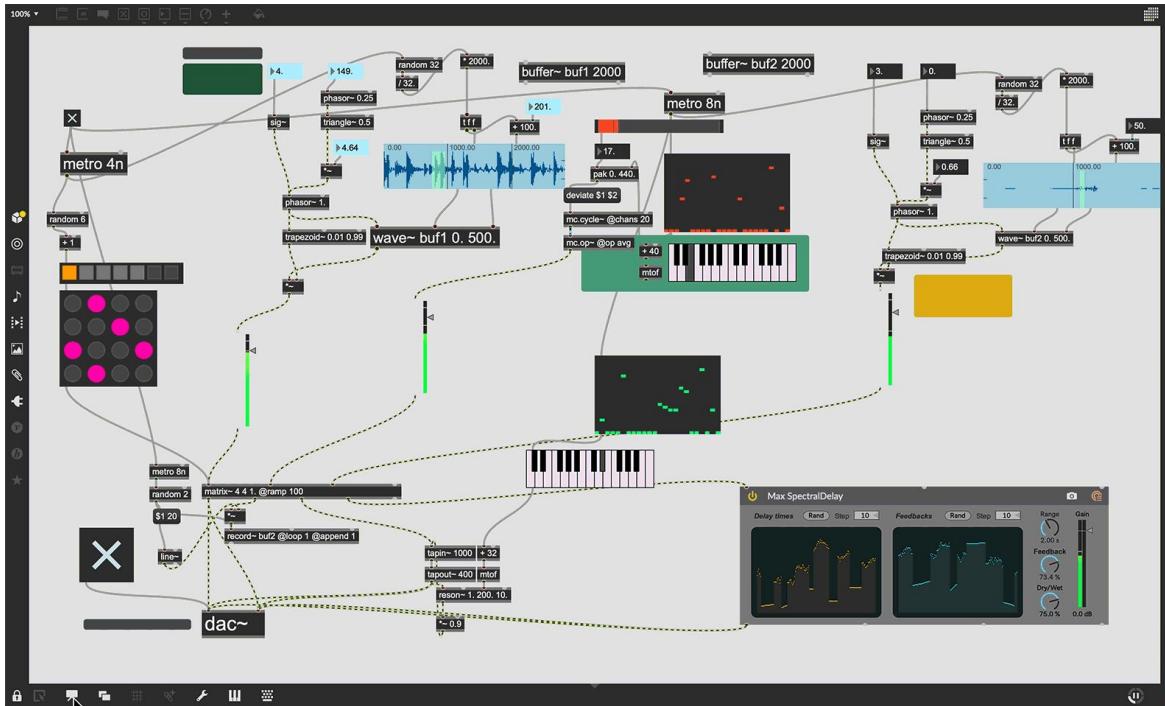
200x - Overtone ?

2009 - TidalCycles

2012 - Sonic-pi, Gibber et l'algorave

2018- Hydra Synth

# Visual programming live coding language ou live patching



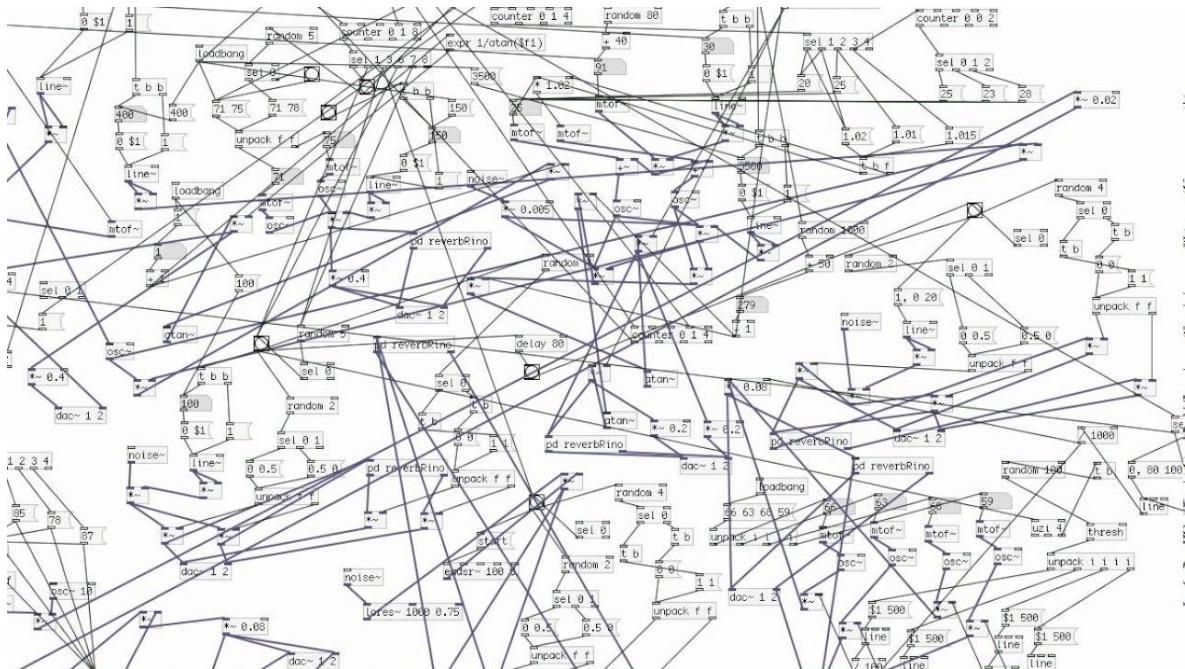
MAX

# Pure Data

Pure data algorithmic music,

Rino Petrozziello,

2017



# Le live coding: SuperCollider (1996)

```
{  
    var snare, bdrum, hihat;  
    var tempo = 4;  
  
    tempo = Impulse.ar(tempo); // for a drunk drummer replace Impulse with Dust !!!  
    snare = WhiteNoise.ar(Decay2.ar(PulseDivider.ar(tempo, 4, 2), 0.005, 0.5));  
    bdrum = SinOsc.ar(Line.ar(120,60, 1), 0, Decay2.ar(PulseDivider.ar(tempo, 4, 0), 0.005, 0.5));  
    hihat = HPF.ar(WhiteNoise.ar(1), 10000) * Decay2.ar(tempo, 0.005, 0.5);  
  
    Out.ar(0, (snare + bdrum + hihat) * 0.4 ! 2)  
}.play
```

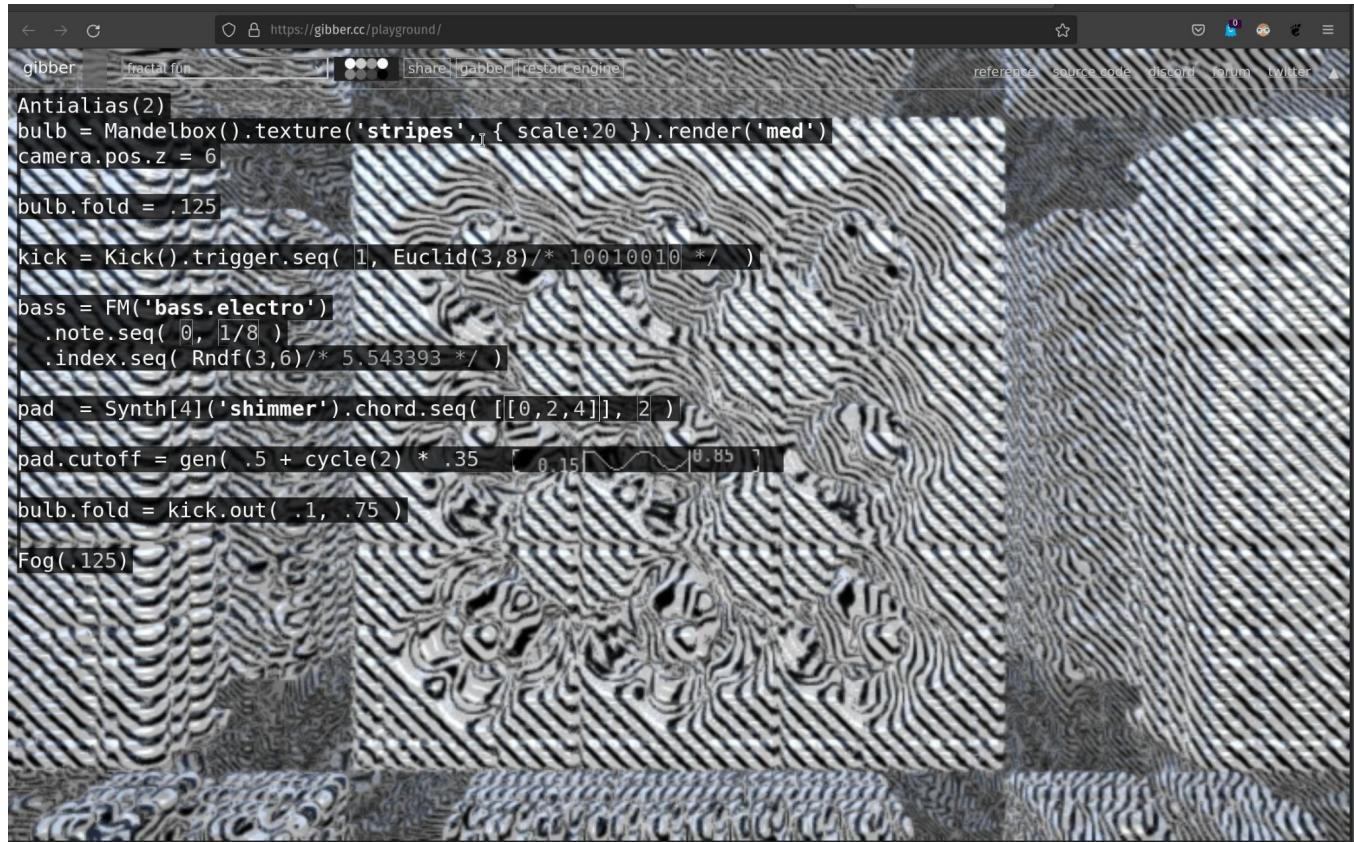
Drummer, Thor Magnusson, 2010

# Sonic-pi

## *Pentatonic Bleeps*

```
with_fx :reverb, mix: 0.2 do  
  loop do  
    play scale(:Eb2, :major_pentatonic, num_octaves: 3).choose, release: 0.1, amp: rand  
    sleep 0.1  
  end  
end
```

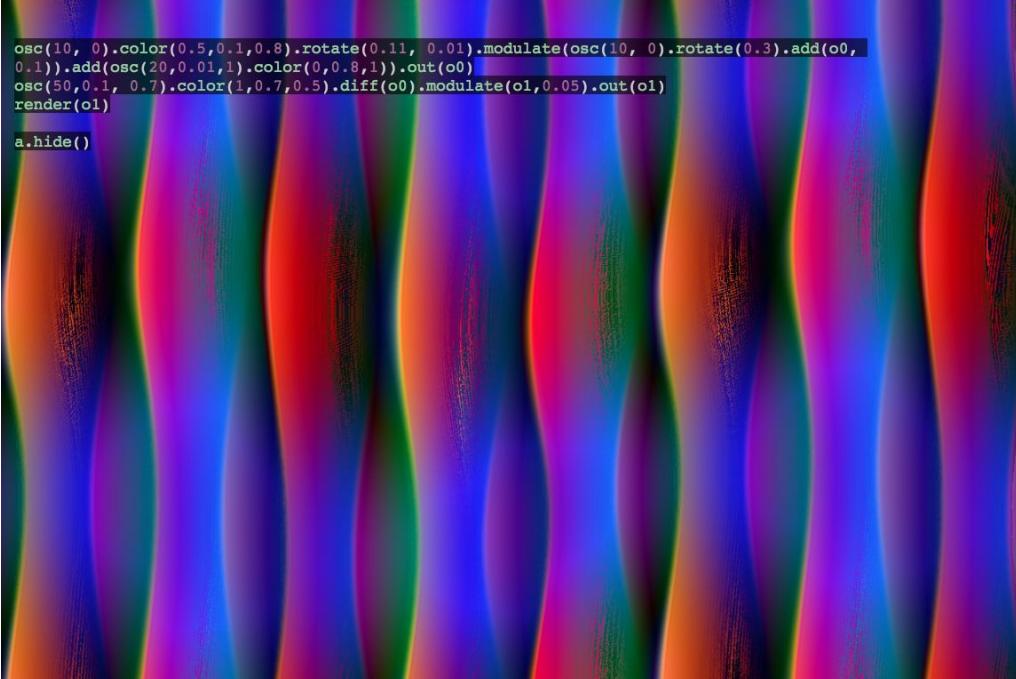
# Gibber



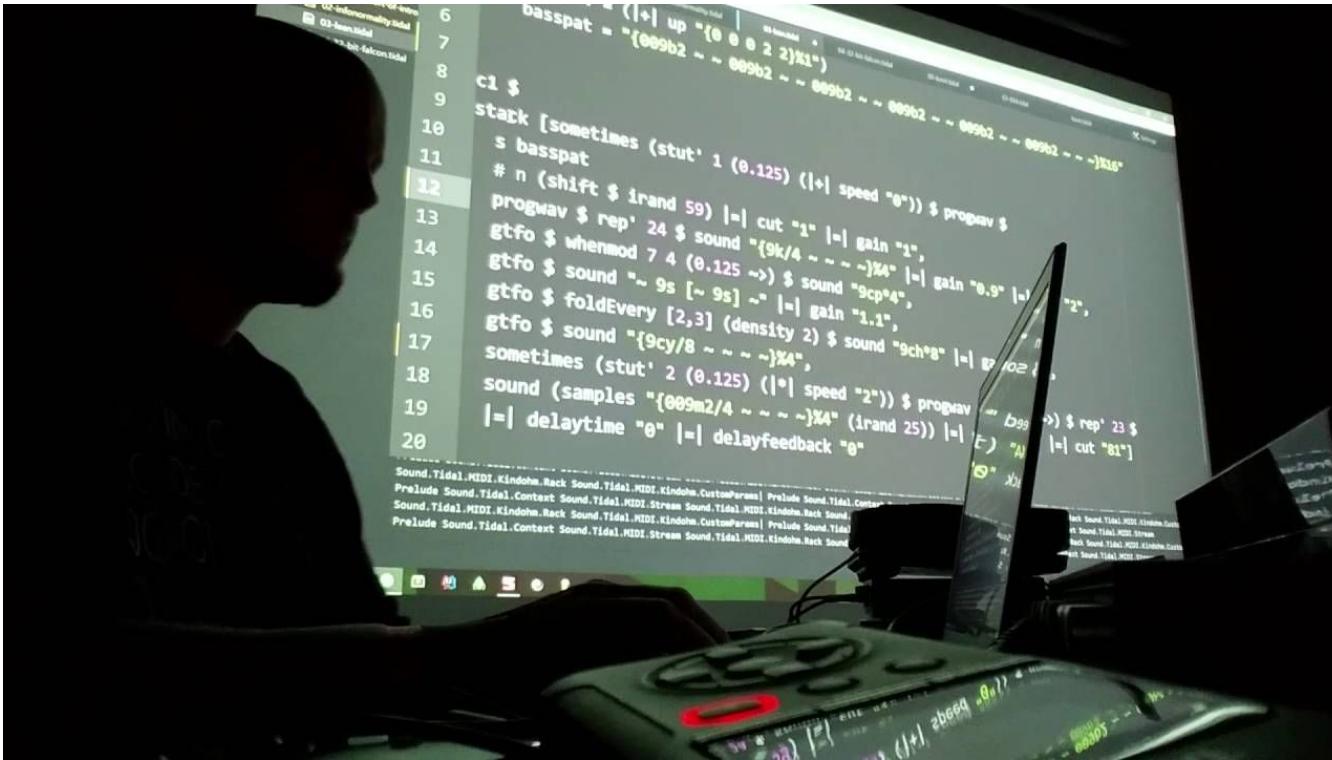
# Hydra video synth

```
osc(10, 0).color(0.5,0.1,0.8).rotate(0.11, 0.01).modulate(osc(10, 0).rotate(0.3).add(o0,
0.1)).add(osc(20,0.01,1).color(0,0.8,1)).out(o0)
osc(50,0.1, 0.7).color(1,0.7,0.5).diff(o0).modulate(o1,0.05).out(o1)
render(o1)

a.hide()
```



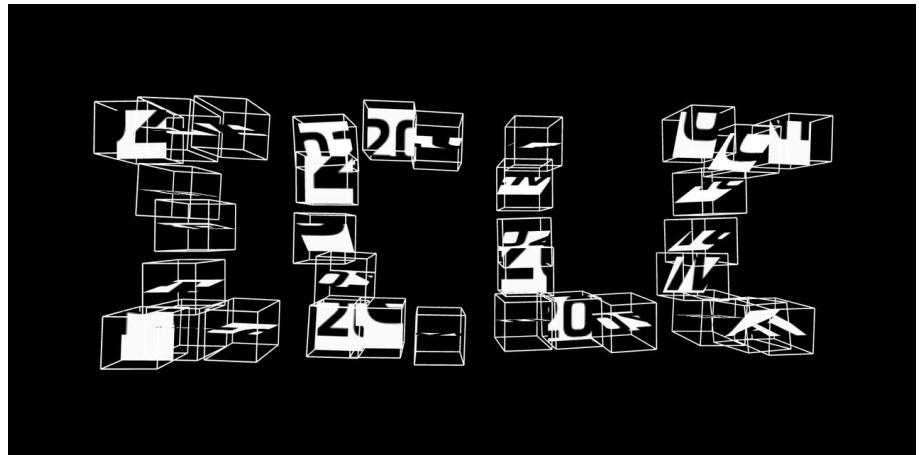
# Tidal



# Les limites du live coding

- performances courtes (20-30 min)
- vision abstraite de la musique
- le logiciel

# Toplap (Transdimensional Organisation for the Proliferation of Live AudioVisual Programming)



# Une algorave à l'ULB ?

- quoi ?
- quand ?
- où ?
- qui ?



# Pour étendre ses connaissances

- Generative art (p5.js, Nannou, processing, ...)
- Demoscene
- OHME



# sauce ?

[https://en.wikipedia.org/wiki/Algorithmic\\_art](https://en.wikipedia.org/wiki/Algorithmic_art)

[https://en.wikipedia.org/wiki/Ben\\_F.\\_Laposky](https://en.wikipedia.org/wiki/Ben_F._Laposky)

<https://digitalartarchive.siggraph.org/artwork/ben-f-laposky-oscillon-40/>

[https://dangerousminds.net/comments/the\\_first\\_ever\\_computer\\_art\\_was\\_made\\_possible\\_by\\_the\\_cold\\_war\\_and\\_it\\_was\\_ahttps://www.theatlantic.com/technology/archive/2013/01/the-never-before-told-story-of-the-worlds-first-computer-art-its-a-sexy-dame/267439/](https://dangerousminds.net/comments/the_first_ever_computer_art_was_made_possible_by_the_cold_war_and_it_was_ahttps://www.theatlantic.com/technology/archive/2013/01/the-never-before-told-story-of-the-worlds-first-computer-art-its-a-sexy-dame/267439/)

<https://desmondhenry.com/about/>

[https://en.wikipedia.org/wiki/Desmond\\_Paul\\_Henry](https://en.wikipedia.org/wiki/Desmond_Paul_Henry)

# sauce ?

<https://www.artnews.com/art-news/artists/herbert-w-franke-nft-interview-1234633400/>

<https://collections.vam.ac.uk/item/O152466/kaes-1-algebraic-curves-print-franke-herbert-w/>

<https://collections.vam.ac.uk/item/O1277447/fourier-transform-offset-print-herbert-w-franke/>

<https://www.artnews.com/art-news/news/herbert-w-franke-dead-1234634406/>

[https://en.wikipedia.org/wiki/Georg\\_Nees](https://en.wikipedia.org/wiki/Georg_Nees)

[https://dam.org/museum/artists\\_ui/artists/nees-georg/](https://dam.org/museum/artists_ui/artists/nees-georg/)

[https://horst-zuse.hier-im-netz.de/Konrad\\_Zuse\\_index\\_english\\_html/rechner\\_z64.html](https://horst-zuse.hier-im-netz.de/Konrad_Zuse_index_english_html/rechner_z64.html)

<https://www.youtube.com/watch?v=yxDQSluWaMs>

<https://www.theguardian.com/science/2016/sep/26/first-recording-computer-generated-music-create-dalan-turing-restored-enigma-code>

<http://news.bbc.co.uk/2/hi/technology/7458479.stm>

<https://on.soundcloud.com/xWtvVBusiAU1wLuu6>

# sauce ?

<https://en.wikipedia.org/wiki/MUSIC-N>

<https://120years.net/music-n-max-mathews-usa-1957/>

[https://en.wikipedia.org/wiki/Illiac\\_Suite](https://en.wikipedia.org/wiki/Illiac_Suite)

<https://distributedmuseum.illinois.edu/exhibit/illiac-suite/>

<https://distributedmuseum.illinois.edu/exhibit/hpschd/>

<https://en.wikipedia.org/wiki/Demoscene>

<https://computerhistory.org/blog/warhol-the-computer/>

[https://en.wikipedia.org/wiki/Th%C3%A9odore\\_D%27op%C3%A9ra\\_Spatial](https://en.wikipedia.org/wiki/Th%C3%A9odore_D%27op%C3%A9ra_Spatial)

<https://computerhistory.org/blog/harold-cohen-and-aaron-a-40-year-collaboration/>

<https://whitney.org/collection/works/67988>

# sauce ?

<https://www.theverge.com/2021/3/11/22325054/beeples-christies-nft-sale-cost-everydays-69-million>

<https://cycling74.com/products/max>

[https://en.wikipedia.org/wiki/Comparison\\_of\\_audio\\_synthesis\\_environments](https://en.wikipedia.org/wiki/Comparison_of_audio_synthesis_environments)

[https://youtu.be/l9\\_3CfRm8GE](https://youtu.be/l9_3CfRm8GE)

<https://supercollider.github.io/examples.html>

<https://charlesmartin.au/blog/2021/01/10/laptop-music-workshop>

<https://github.com/quillec/ambi>

<https://gibber.cc/>

[https://hydra.ojack.xyz/?sketch\\_id=khoparzi\\_0](https://hydra.ojack.xyz/?sketch_id=khoparzi_0)

<https://ojack.xyz/>

# sauce ?

artist: <https://github.com/kindohm>

<https://youtu.be/smQOjFt8e4Q>

<https://toplap.org/>

<https://algorave.com/>

<https://iclc.toplap.org/>

<https://ohme.be/studio/>

<https://nannou.cc/>

<https://p5js.org/>

[https://hydra.ojack.xyz/?sketch\\_id=khoparzi\\_0](https://hydra.ojack.xyz/?sketch_id=khoparzi_0)

<https://toplap.org/>

<https://algorave.com/>

<https://ohme.be/studio/>

<https://youtu.be/EyltlakqyDk?si=LEmFMwahVwc2jwc6>

<https://on.soundcloud.com/xWtvVBusiAU1wLuu6>

<https://www.a1k0n.net/2011/07/20/donut-math.html>

artist: <https://github.com/kindohm>

kindohm @ICLC 2016: <https://youtu.be/smQOift8e4Q>

# Liens Intéressants

<https://gitlab.com/then-try-this/samplebrain> pas vraiment live coding

<https://soundlab.cs.princeton.edu/software/> les softwares de l'université de Princeton

<https://www.reddit.com/r/livecoding/> subreddit sur le live coding

<https://github.com/pjagielski/awesome-live-coding-music>

<https://github.com/toplap/awesome-livecoding>

<https://www.youtube.com/watch?v=S2EZqikClfY>

[https://en.wikipedia.org/wiki/List\\_of\\_music\\_software](https://en.wikipedia.org/wiki/List_of_music_software)

<https://strudel.cc/>

<https://overtone.github.io/>

# Liens Intéressants

<https://youtu.be/EyltlakqyDk?si=LEmFMwahVwc2jwc6>

<https://www.a1k0n.net/2011/07/20/donut-math.html>

<https://glicol.org/>

<https://direct.mit.edu/books/oa-monograph/5495/Live-CodingA-User-s-Manual>

<https://youtube.com/playlist?list=PLaitaNxyd8SHvTQjRGnMdKLsARXW7iYyp&si=PCM6twIsBZORxMqa>