GRAMAZIO KOHLER RESEARCH

dbt

ETH zürich

MAS Digital Fabrication

Computational Art

October 7th, 2020

Computational Art

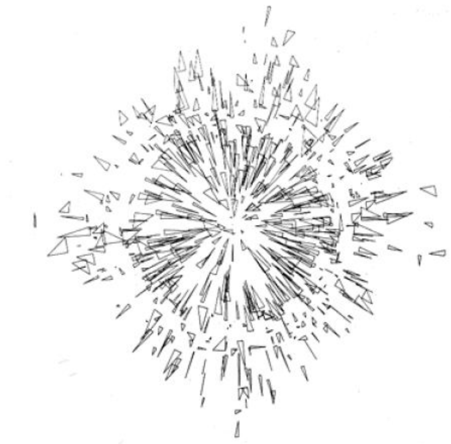


FIGURE 3. *Splatter Diagram* (often titled *Splatter Pattern*), 1963. Ballistic Research Laboratories, Aberdeen, Maryland.

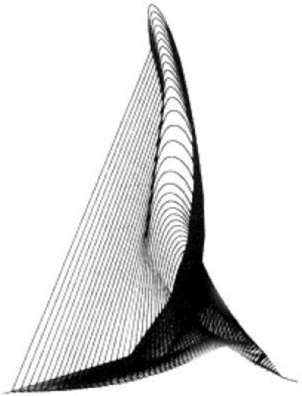


FIGURE 4. *Trajectories of a Ricocheting Projectile*, 1964. Ballistic Research Laboratories, Aberdeen, Maryland.

Man versus Machine

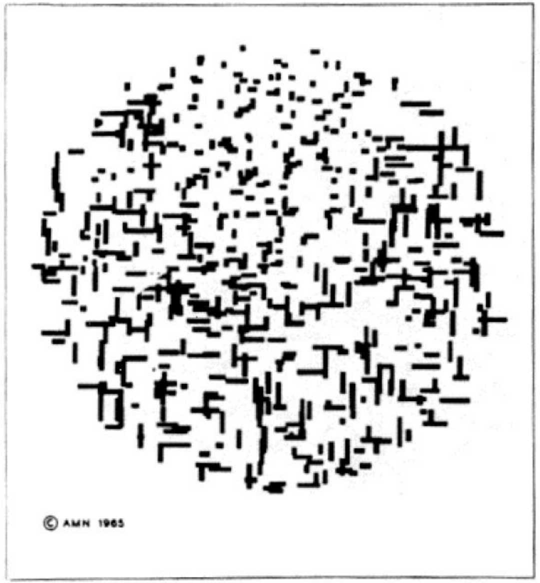


FIGURE 9. A. Michael Noll. *Computer Composition with Lines*, 1965.

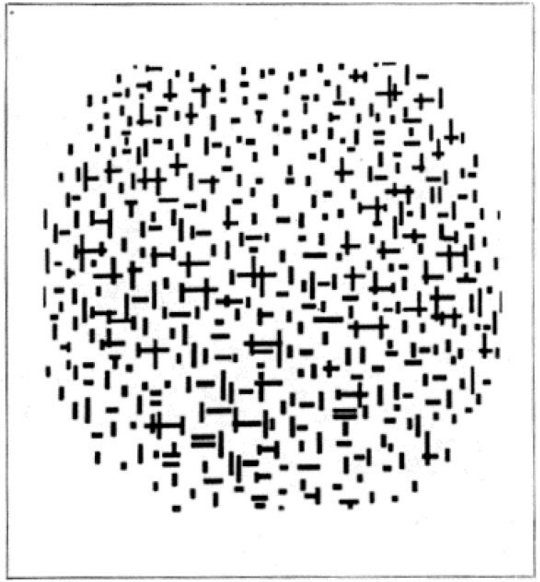


FIGURE 10. Black and white reproduction of Piet Mondrian's *Composition with Lines*, 1914.

Grant D. Taylor, *The Machine that made Science Art, The Troubled History of Computer Art*, 2004

Beauty of nature, harmony of mathematics

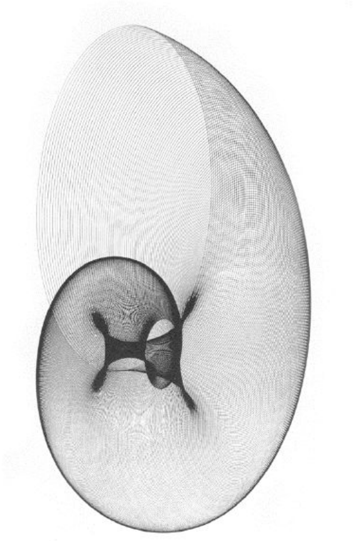


FIGURE 16. Kerry Strand from California Computer Products, *The Snail*, 1968.

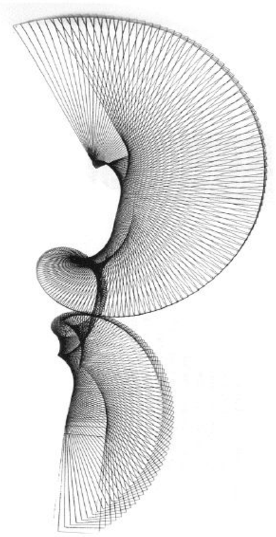
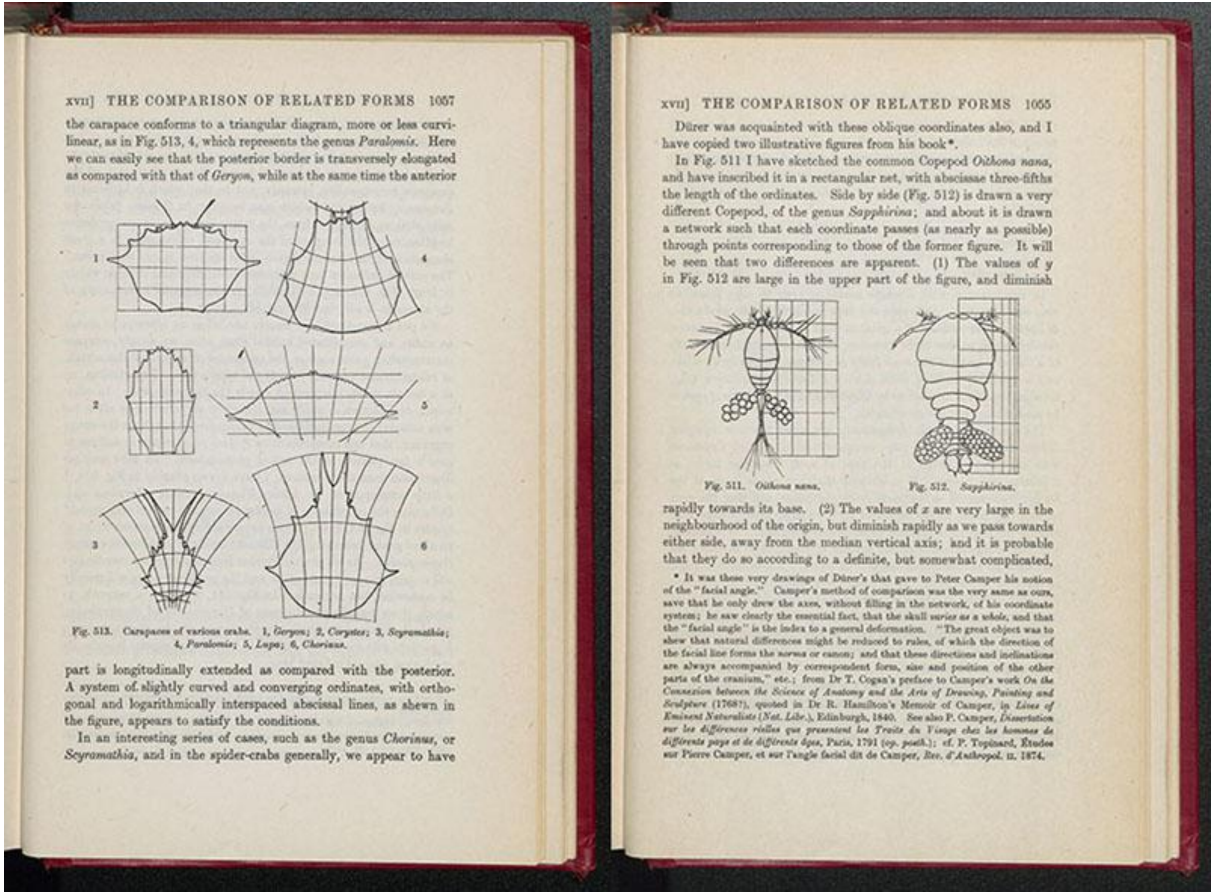


FIGURE 17. A. M. France *Sketch for a Mural*, 1969.



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the carapace conforms to a triangular diagram, more or less curvilinear, as in Fig. 513, 4, which represents the genus *Paralomis*. Here we can easily see that the posterior border is transversely elongated as compared with that of *Geryon*, while at the same time the anterior

Fig. 513. Carapaces of various crabs. 1, *Geryon*; 2, *Corystes*; 3, *Scyramathia*; 4, *Paralomis*; 5, *Lupa*; 6, *Chorinus*.

part is longitudinally extended as compared with the posterior. A system of slightly curved and converging ordinates, with orthogonal and logarithmically interspaced abscissal lines, as shewn in the figure, appears to satisfy the conditions.

In an interesting series of cases, such as the genus *Chorinus*, or *Scyramathia*, and in the spider-crabs generally, we appear to have

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Dürer was acquainted with these oblique coordinates also, and I have copied two illustrative figures from his book*.

In Fig. 511 I have sketched the common Copepod *Oithona nana*, and have inscribed it in a rectangular net, with abscissae three-fifths the length of the ordinates. Side by side (Fig. 512) is drawn a very different Copepod, of the genus *Sapphirina*; and about it is drawn a network such that each coordinate passes (as nearly as possible) through points corresponding to those of the former figure. It will be seen that two differences are apparent. (1) The values of y in Fig. 512 are large in the upper part of the figure, and diminish

Fig. 511. *Oithona nana*. Fig. 512. *Sapphirina*.

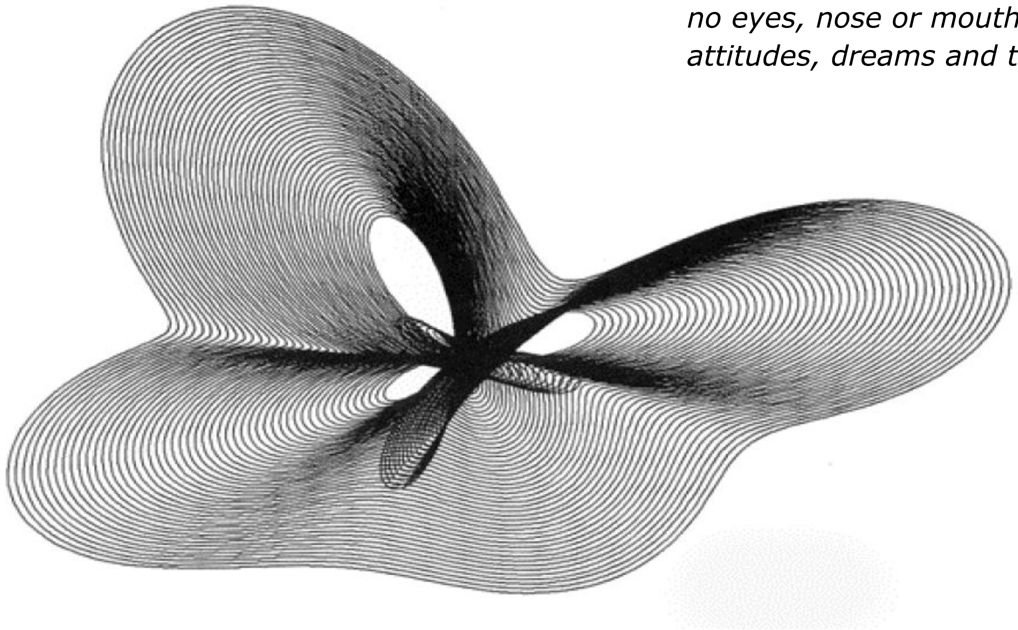
rapidly towards its base. (2) The values of x are very large in the neighbourhood of the origin, but diminish rapidly as we pass towards either side, away from the median vertical axis; and it is probable that they do so according to a definite, but somewhat complicated,

* It was these very drawings of Dürer's that gave to Peter Camper his notion of the "facial angle." Camper's method of comparison was the very same as ours, save that he only drew the axes, without filling in the network, of his coordinate system; he saw clearly the essential fact, that the skull *varies as a whole*, and that the "facial angle" is the index to a general deformation. "The great object was to shew that natural differences might be reduced to rules, of which the direction of the facial line forms the *norma* or canon; and that these directions and inclinations are always accompanied by correspondent form, size and position of the other parts of the cranium," etc.; from Dr T. Cogan's preface to Camper's work *On the Connexion between the Science of Anatomy and the Arts of Drawing, Painting and Sculpture* (1768?), quoted in Dr R. Hamilton's Memoir of Camper, in *Lives of Eminent Naturalists* (*Nat. Libr.*), Edinburgh, 1840. See also P. Camper, *Dissertation sur les différences réelles que présentent les Traits du Visage chez les hommes de différents pays et de différents âges*, Paris, 1791 (op. posth.); cf. P. Topinard, Études sur Pierre Camper, et sur l'angle facial dit de Camper, *Rev. d'Anthropol.* II, 1874.

Growth and Form, D'Arcy Thompson, 1017

Emergence of the Artist-Programmer

"This drawing is of a real person:
no eyes, nose or mouth, but the personality,
attitudes, dreams and the conscience."



Lloyd Sumner, Self portrait, 1968

Grant D. Taylor, *The Machine that made Science Art, The Troubled History of Computer Art*, 2004

ASCII art

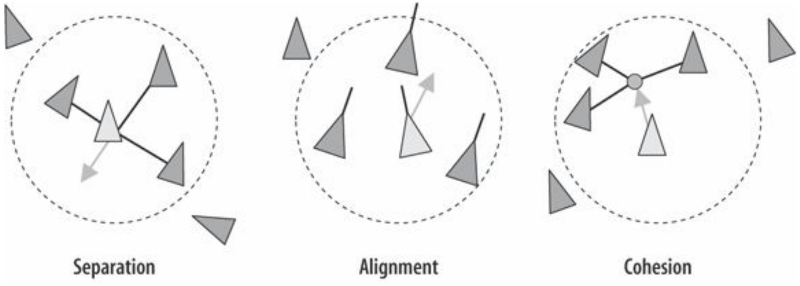
Dwarf Fortress, Tarn Adams and Zach Adams

ASCII art with p5.js, mathiasbernhard.ch

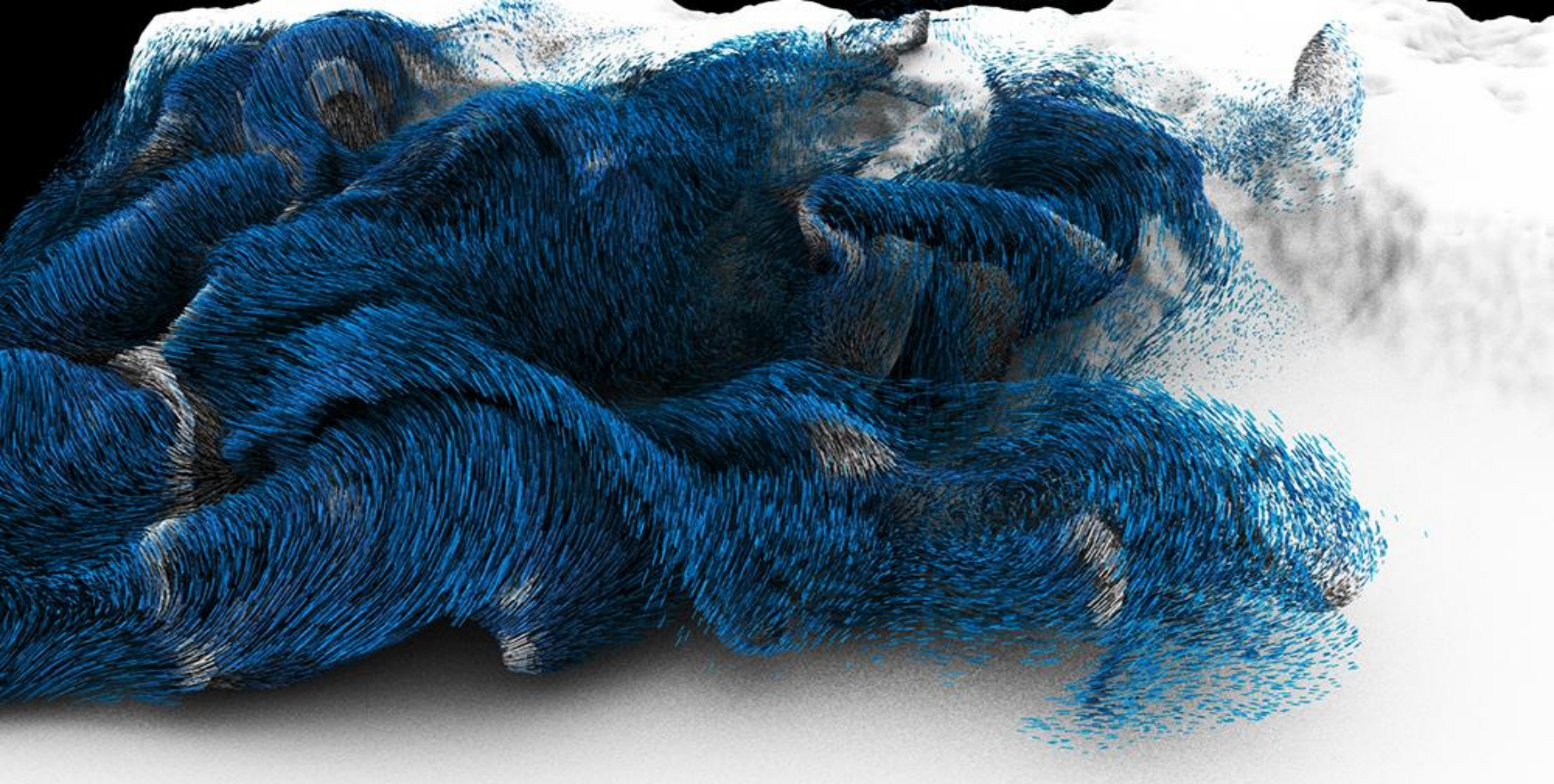
Inspiration from Nature

Romanesco Brassica oleracea close Richard Bartz, wikipedia.com

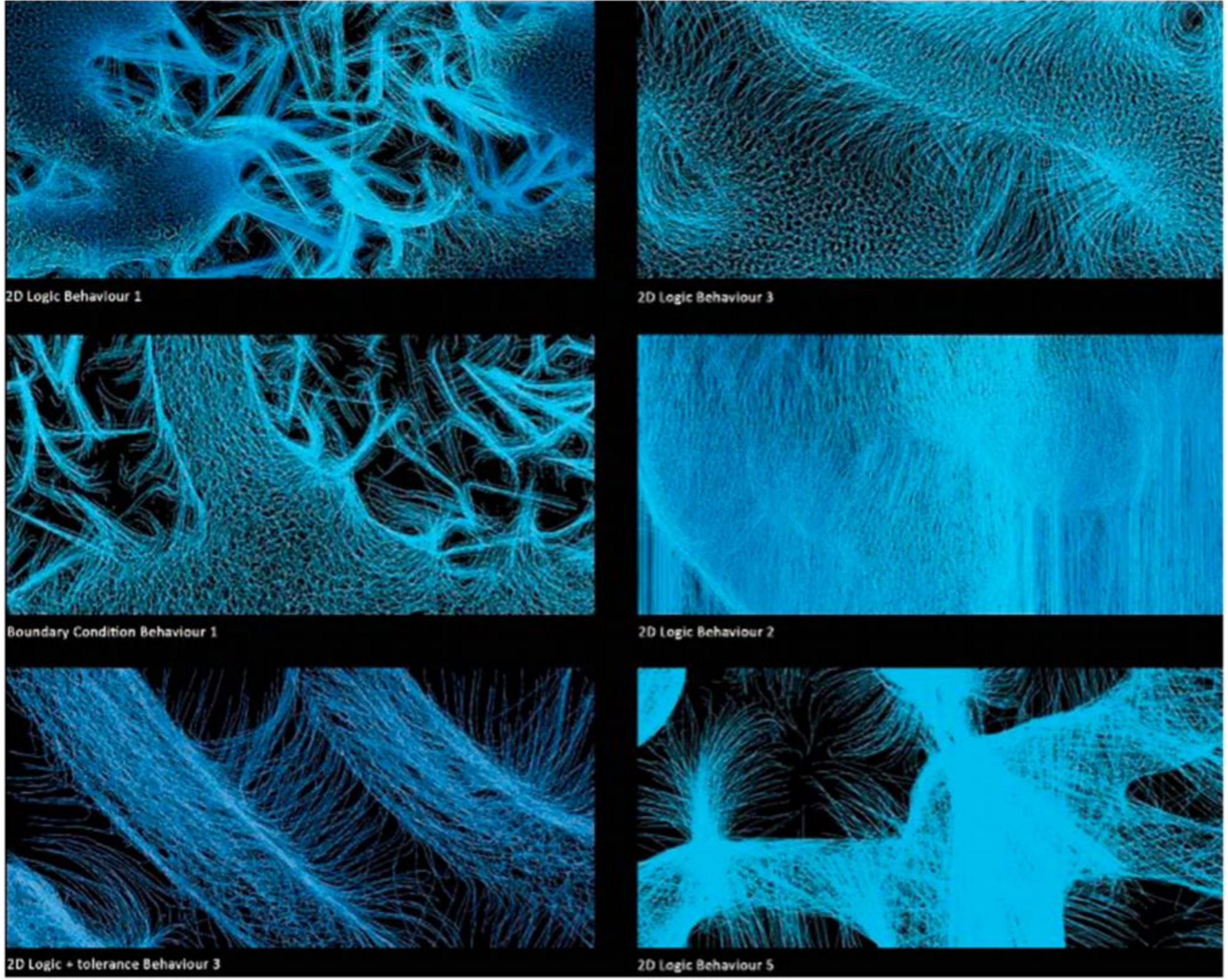
Multi-agent systems



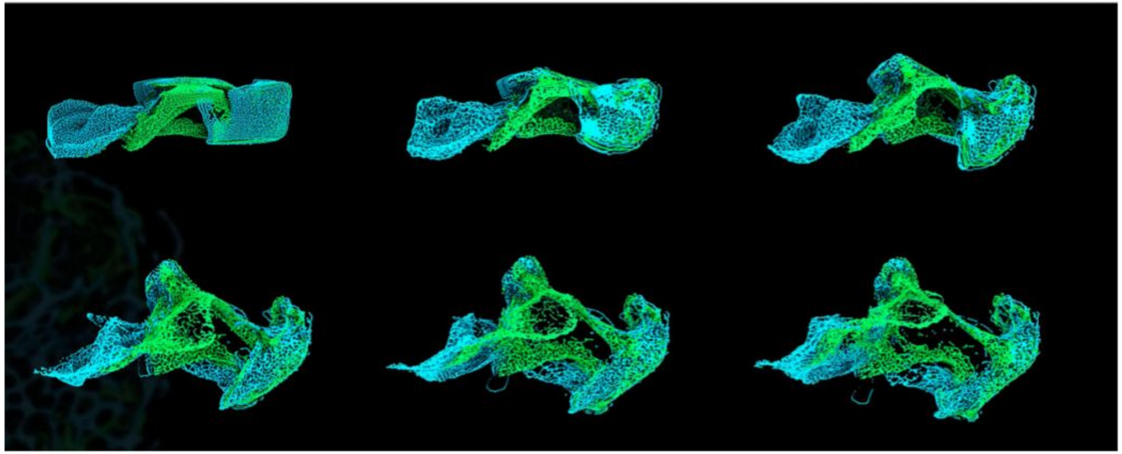
Boids, Craig Reynolds, 1986



River Hydrology. Bartlett School of Architecture, Alisa Andrasek. 2015. Students: Konstantinos ALEXOPOULOS, Jingya HUANG, Tao SONG, & Liaoliao XI



Project: nDprint, Alisa Andrasek, 2016. Students: Pallavi Sharma, Enzo D'Auria, Nicolo Friedman & Mark Muscat



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Project: Fluid motion, Alisa Andrasek, 2016. Students: Source: Shuwei Hao, Shuo Qian, Jingjun Tao & Tianran Dong

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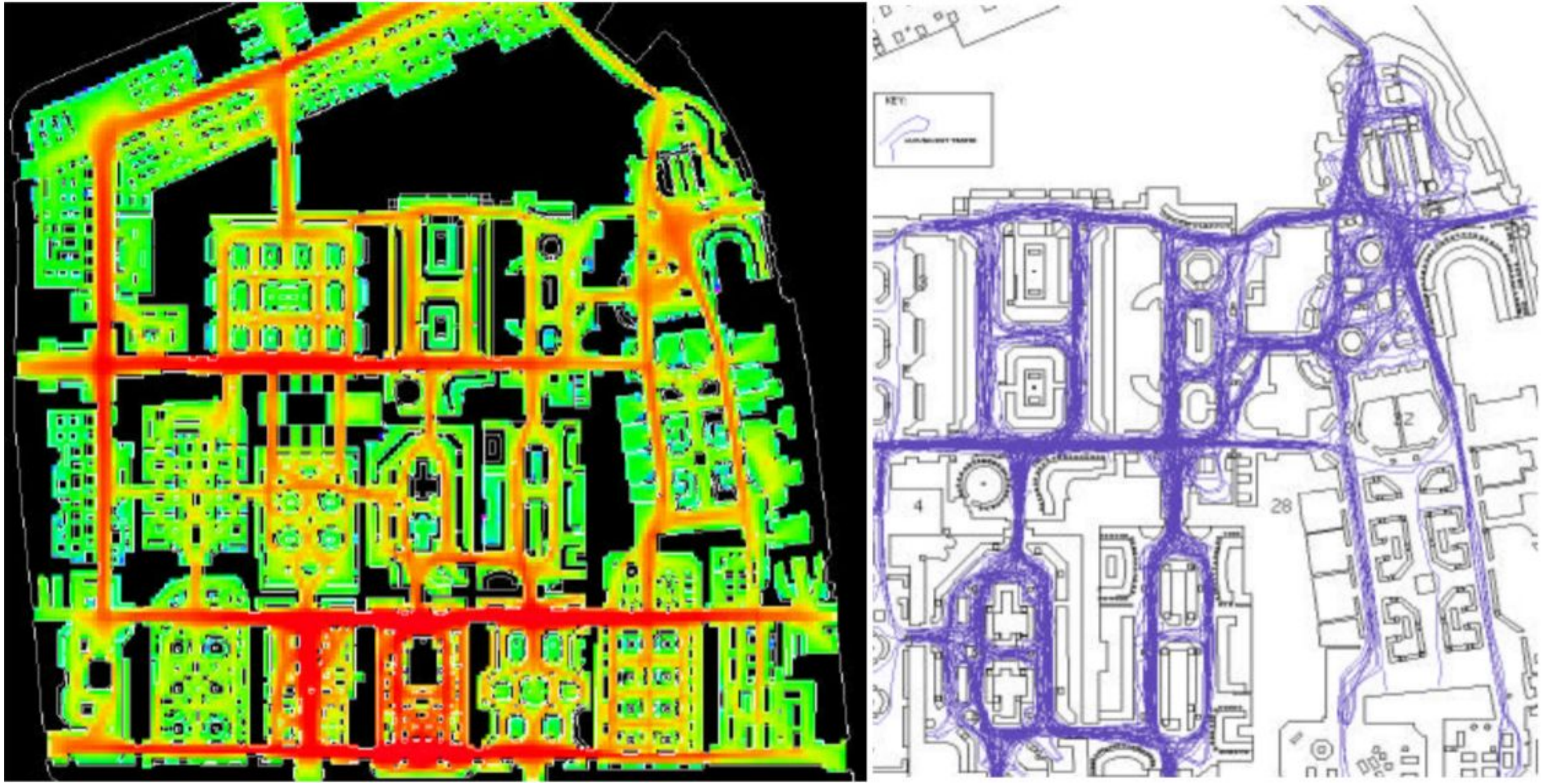
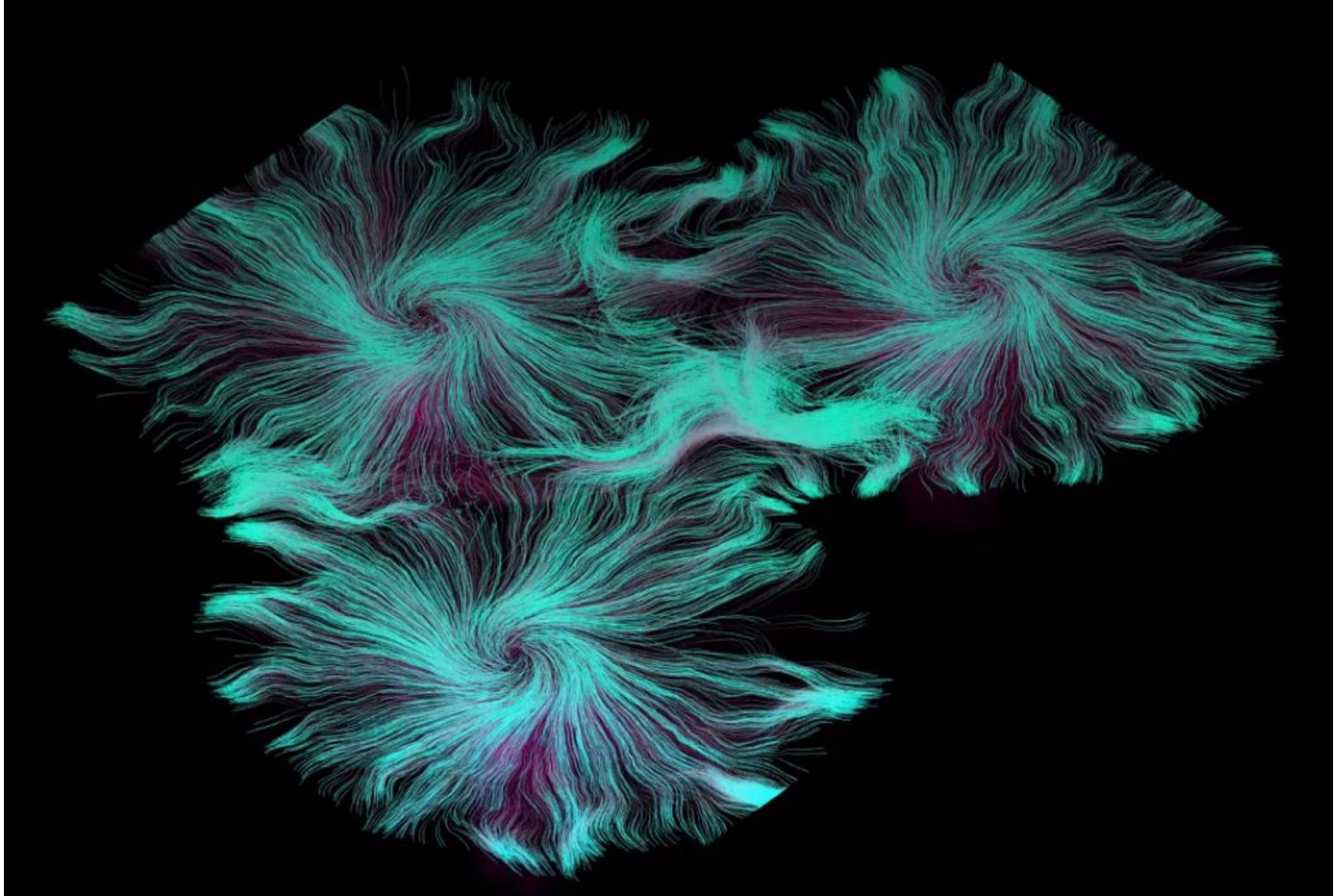


Penn, Alan & Turner, Alasdair. (2001). Space Syntax Based Agent Simulation.

Proto-House, SoftKill design, 2013, AA Design Research Lab

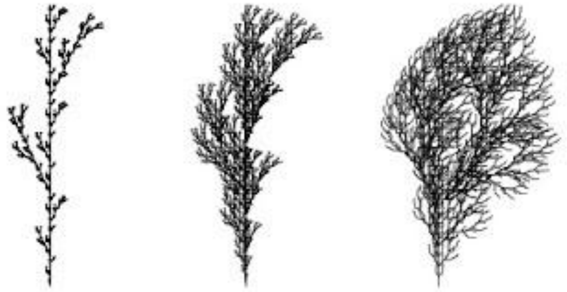
Proto-House, SoftKill design, 2013, AA Design Research Lab



https://www.alisaandrasek.com/projects/cloud-pergola

Cloud Pergola, Alisa Andrasek, 2018

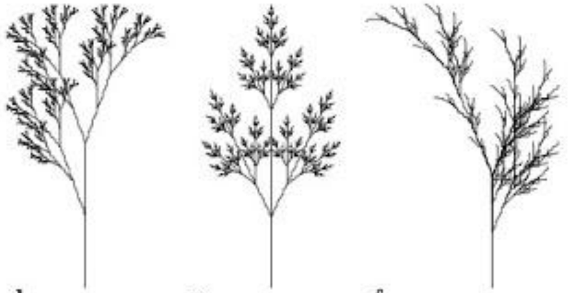
L-systems



a
n=5, δ=25.7°
F
F → F[+F]F[-F]F

b
n=5, δ=20°
F
F → F[+F]F[-F][F]

c
n=4, δ=22.5°
F
F → FF-[-F+F+F]+
[+F-F-F]

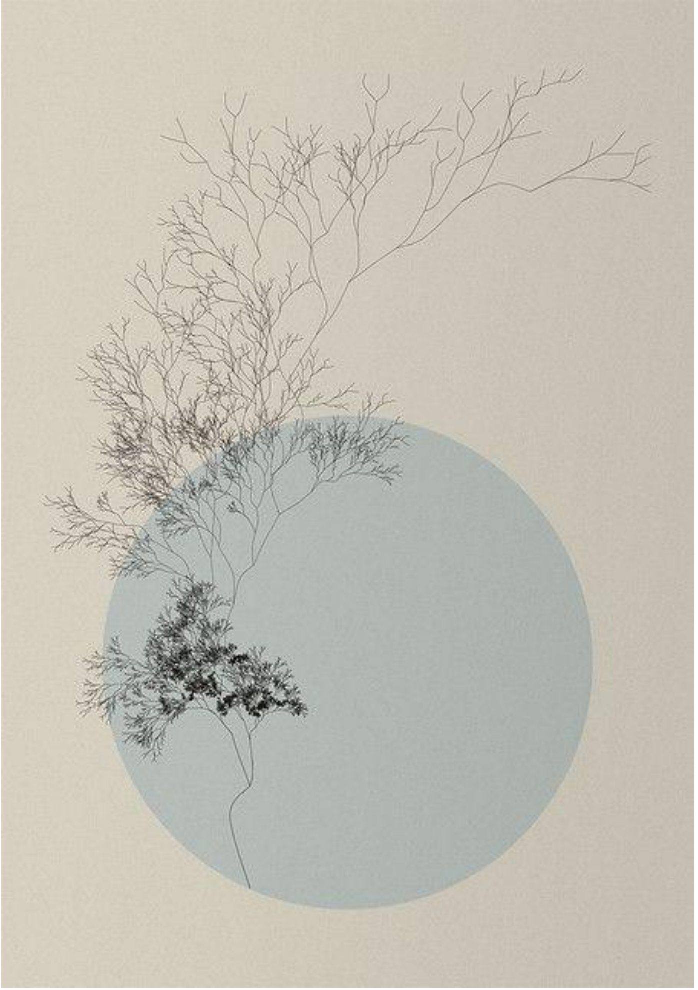


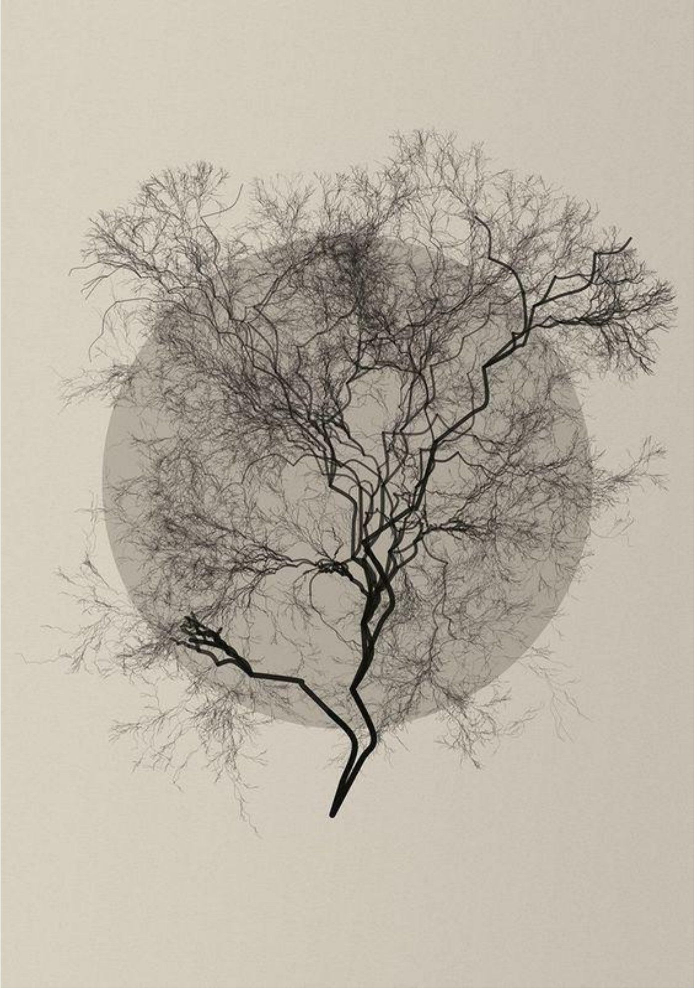
d
n=7, δ=20°
X
X → F[+X]F[-X]+X
F → FF

e
n=7, δ=25.7°
X
X → F[+X][-X]FX
F → FF

f
n=5, δ=22.5°
X
X → F-[[X]+X]+F[+FX]-X
F → FF

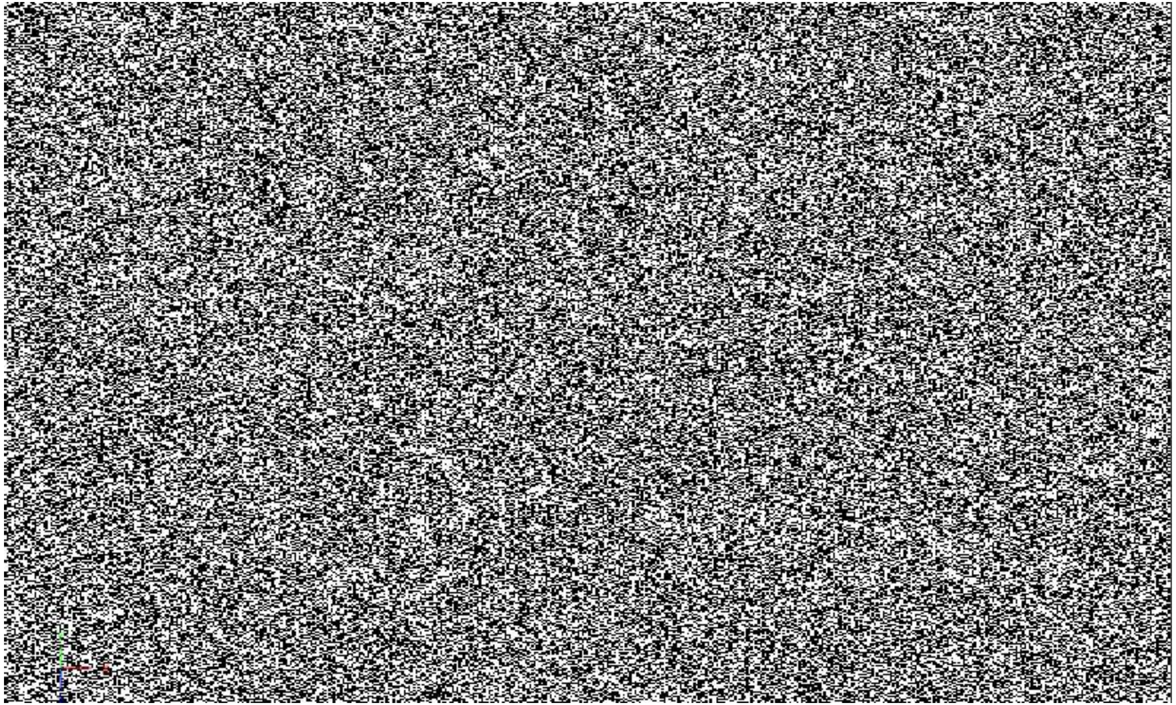
Figure 1.24: Examples of plant-like structures generated by bracketed OL-systems. L-systems (a), (b) and (c) are edge-rewriting, while (d), (e) and (f) are node-rewriting.





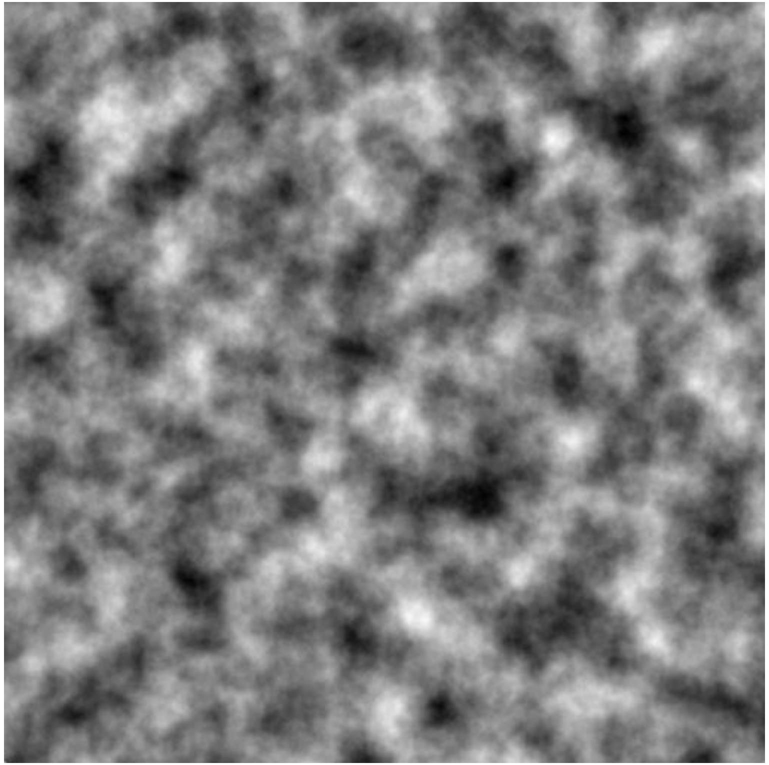
‘Exploring the L system’, Diana lange,

Randomness



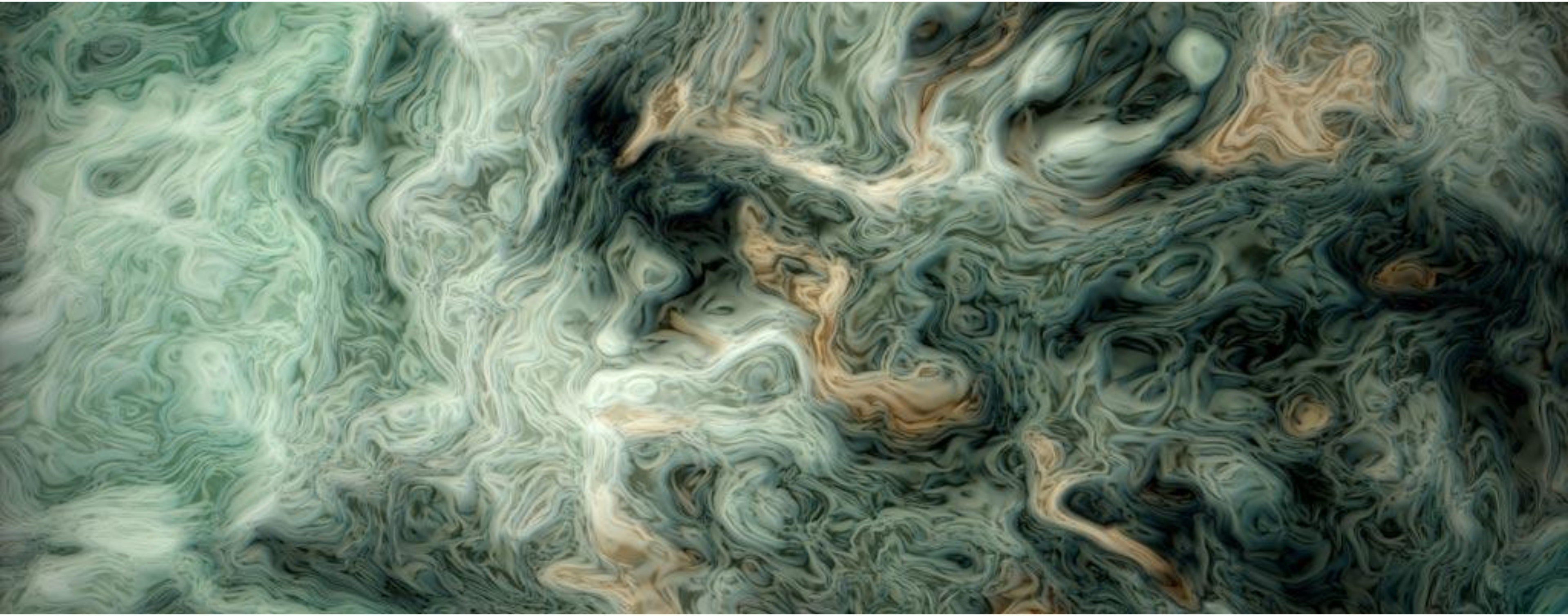
Pure Noise, apkpure.com

Perlin Noise



Perlin Noise, yvanscher.com

$f(p) = fbm(p+fbm(p+fbm(p)))$



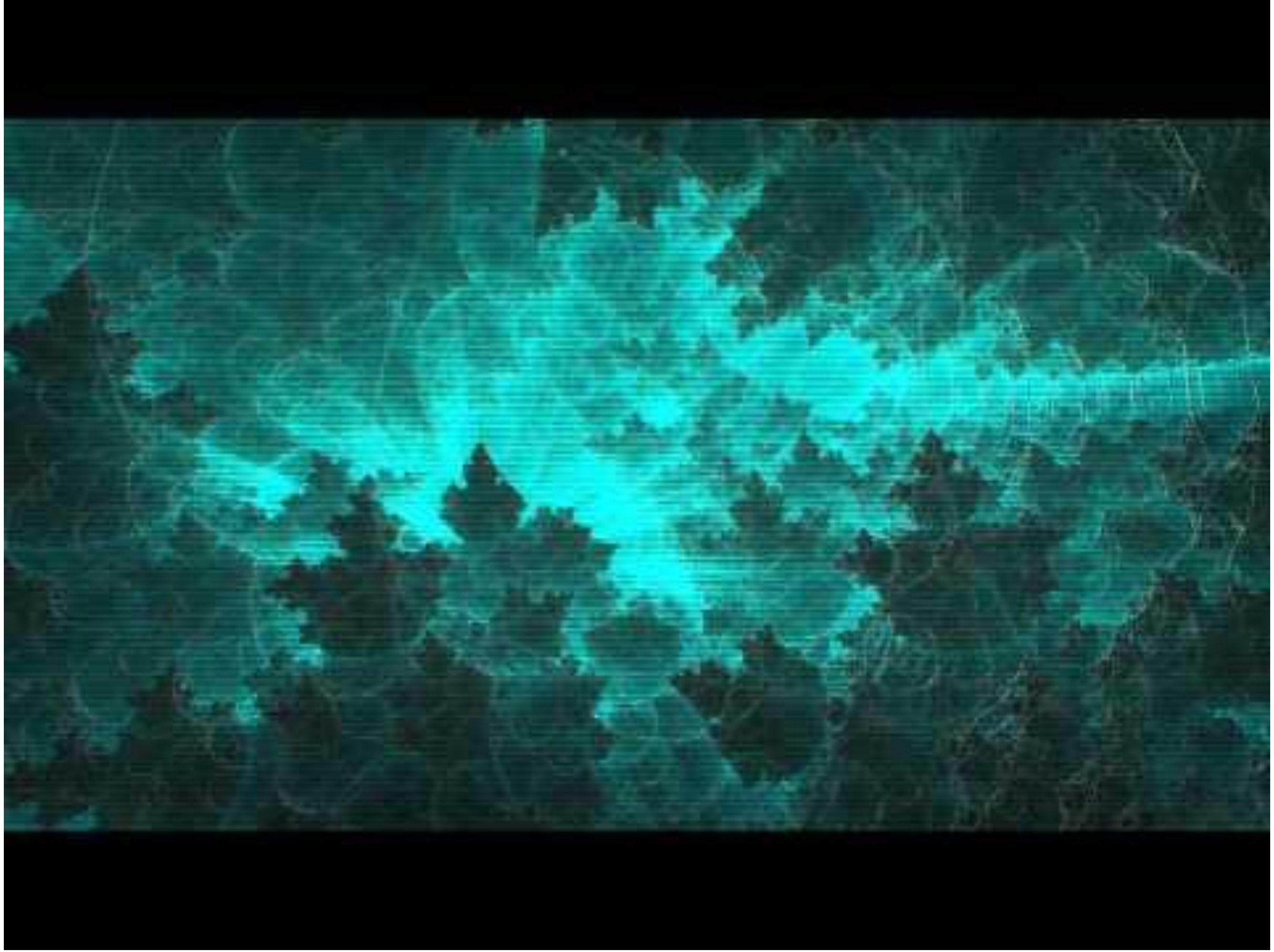
Substance, artstation.com, procedurally generated materials

Fractals

Intricate fractals, mossandfog.com

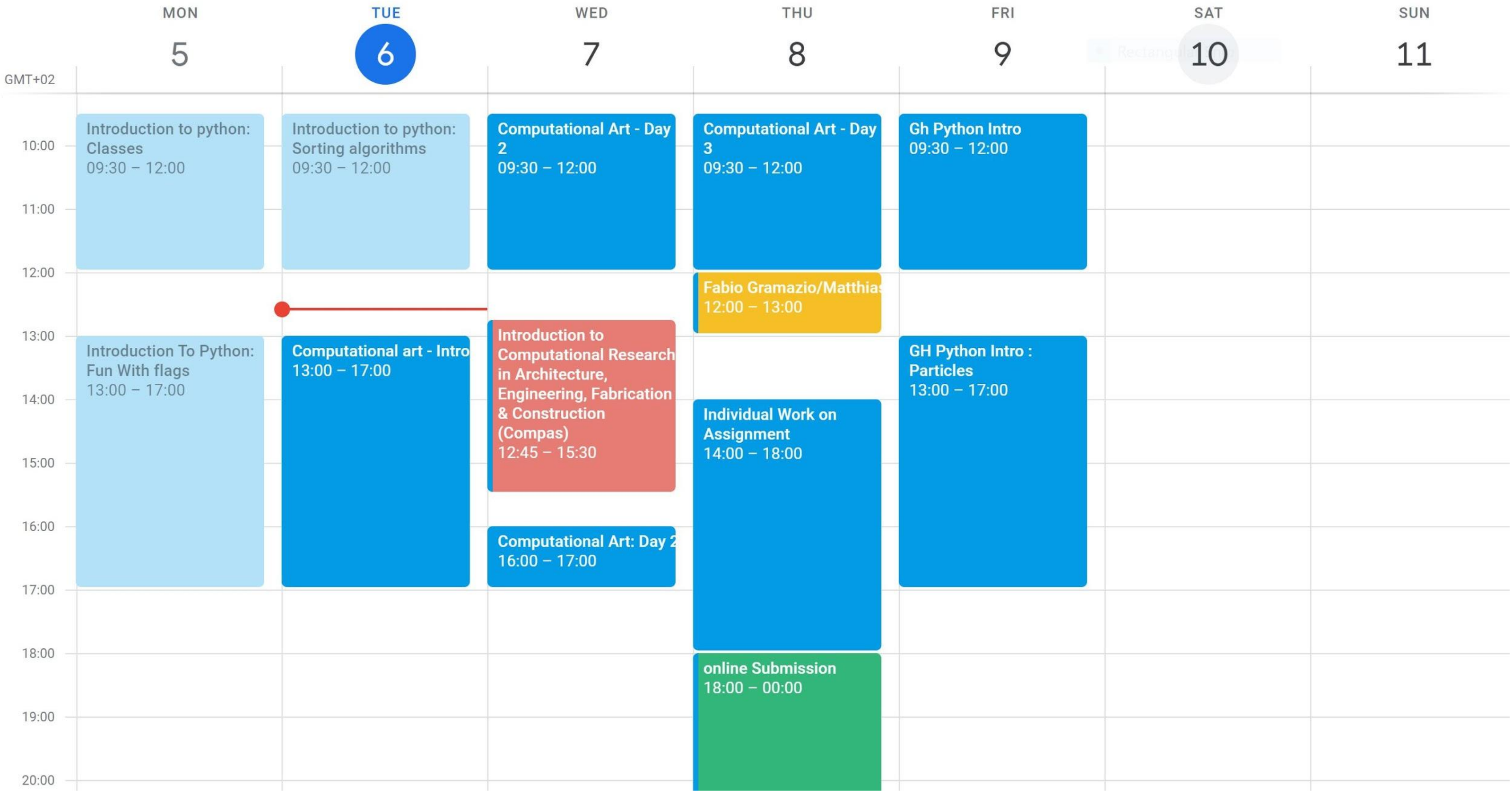

https://www.shadertoy.com/view/Xtt3Wn

Fermi Paradox - Mercury, Demoscene 2016, 64K Winner



Hartverdrahtet, Demoscene, 4k Winner, 2012

Schedule


MON 5
TUE 6
WED 7
THU 8
FRI 9
SAT 10
SUN 11
GMT+02
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
Introduction to python: Classes
09:30 – 12:00
Introduction To Python: Fun With flags
13:00 – 17:00
Introduction to python: Sorting algorithms
09:30 – 12:00
Computational art - Intro
13:00 – 17:00
Computational Art - Day 2
09:30 – 12:00
Introduction to Computational Research in Architecture, Engineering, Fabrication & Construction (Compas)
12:45 – 15:30
Computational Art: Day 2
16:00 – 17:00
Computational Art - Day 3
09:30 – 12:00
Fabio Gramazio/Matthias
12:00 – 13:00
Individual Work on Assignment
14:00 – 18:00
online Submission
18:00 – 00:00
Gh Python Intro
09:30 – 12:00
GH Python Intro : Particles
13:00 – 17:00