AALTO SUMMER SCHOOL CIRCULAR ECONOMY AND CO-DESIGN 2022

COMPLEXITY SCIENCE & SPECULATIVE DESIGN PRACTICES

MONDAY, AUGUST 1ST, 2022

JEONGKI LIM, THE NEW SCHOOL PARSONS SCHOOL OF DESIGN

PARSONS
A! Aalto University

Special Thanks

AGENDA

Complexity & Circularity + Play

Break

Speculative Practices + Play

An invitation

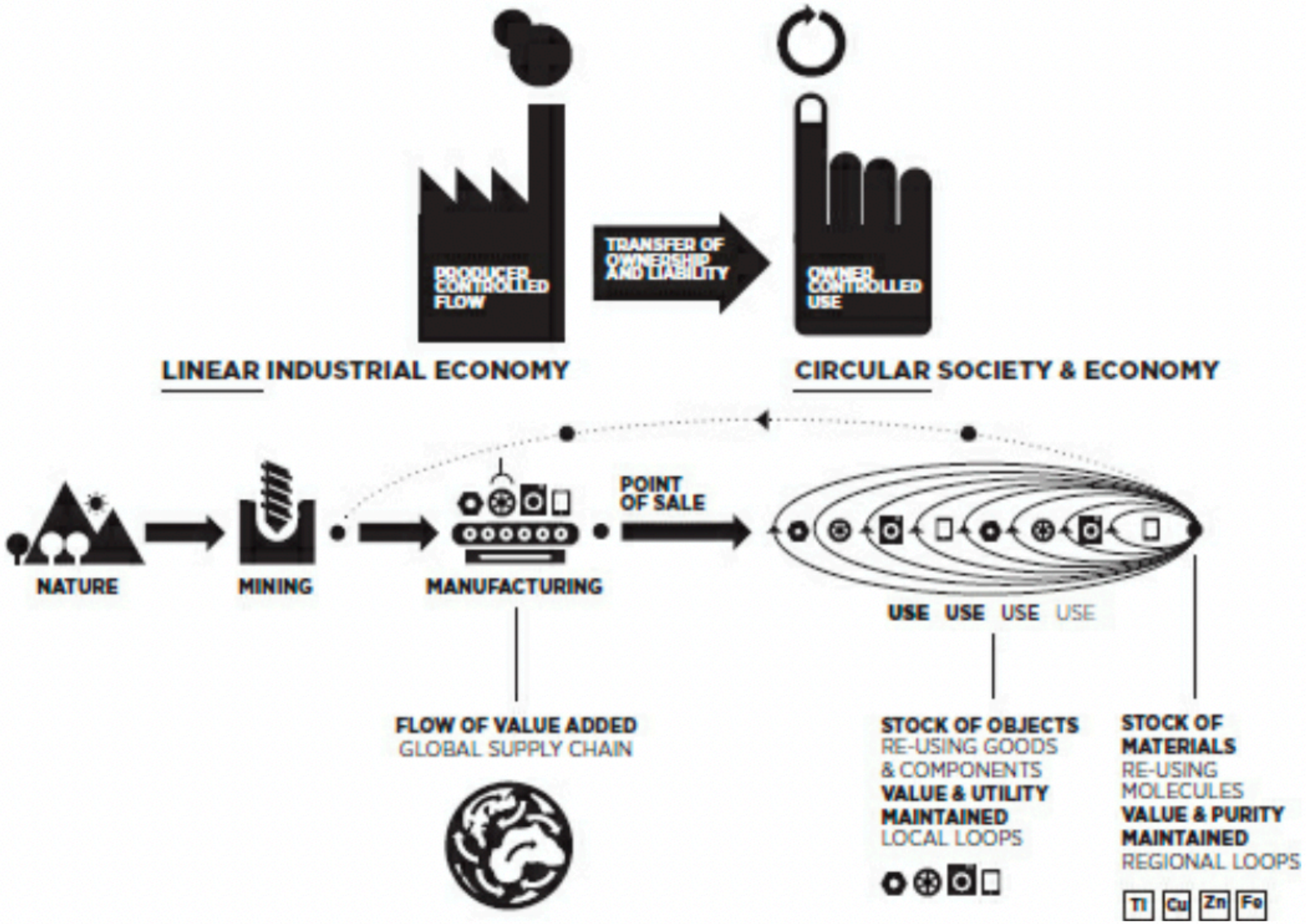
AGENDA

Complexity & Circularity + Play

Break

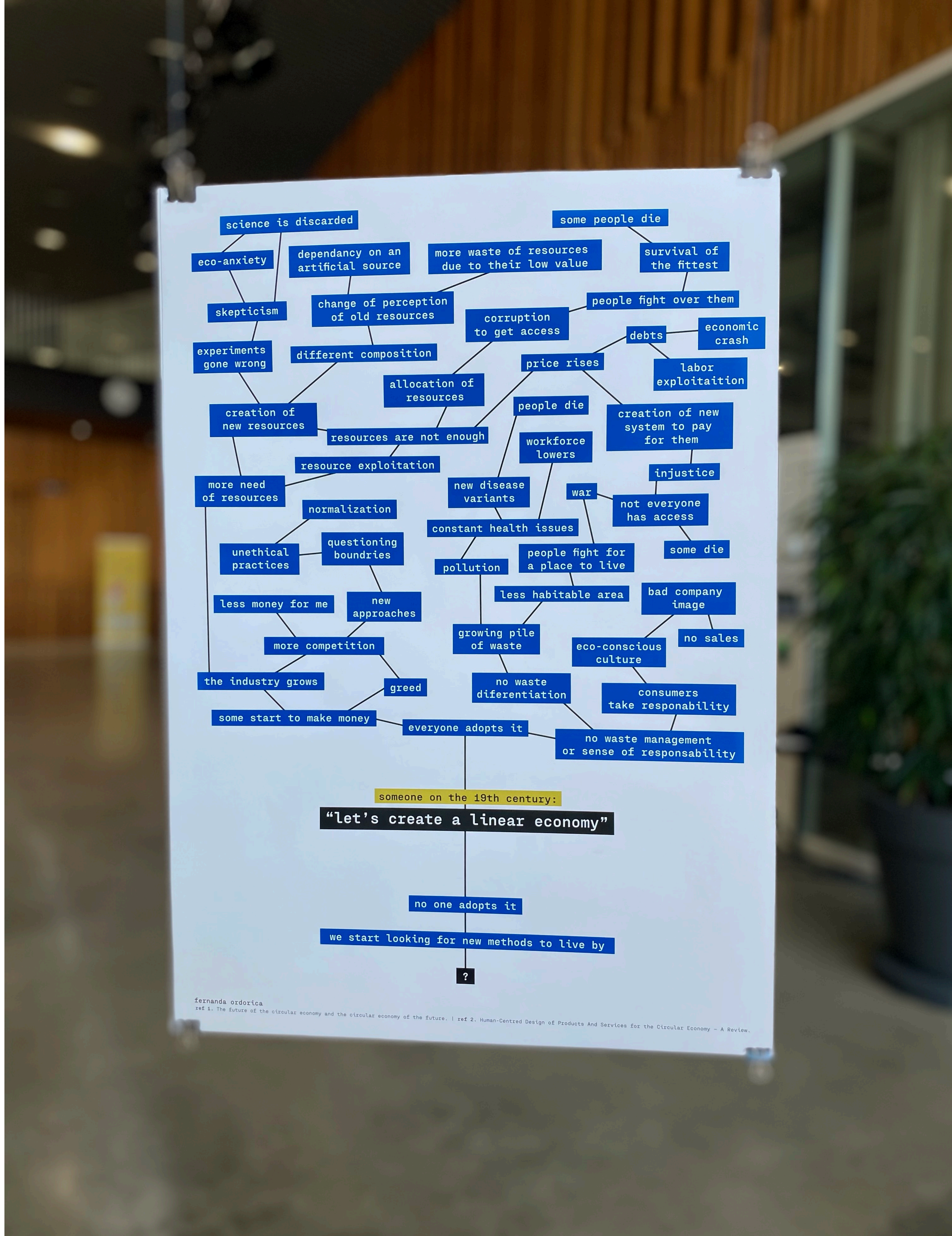
Speculative Practices + Play

From Linear Models To Circular Models



The characteristics of the linear industrial economy and the circular society and economy

Stahel, Walter R. The Circular Economy. Taylor and Francis.



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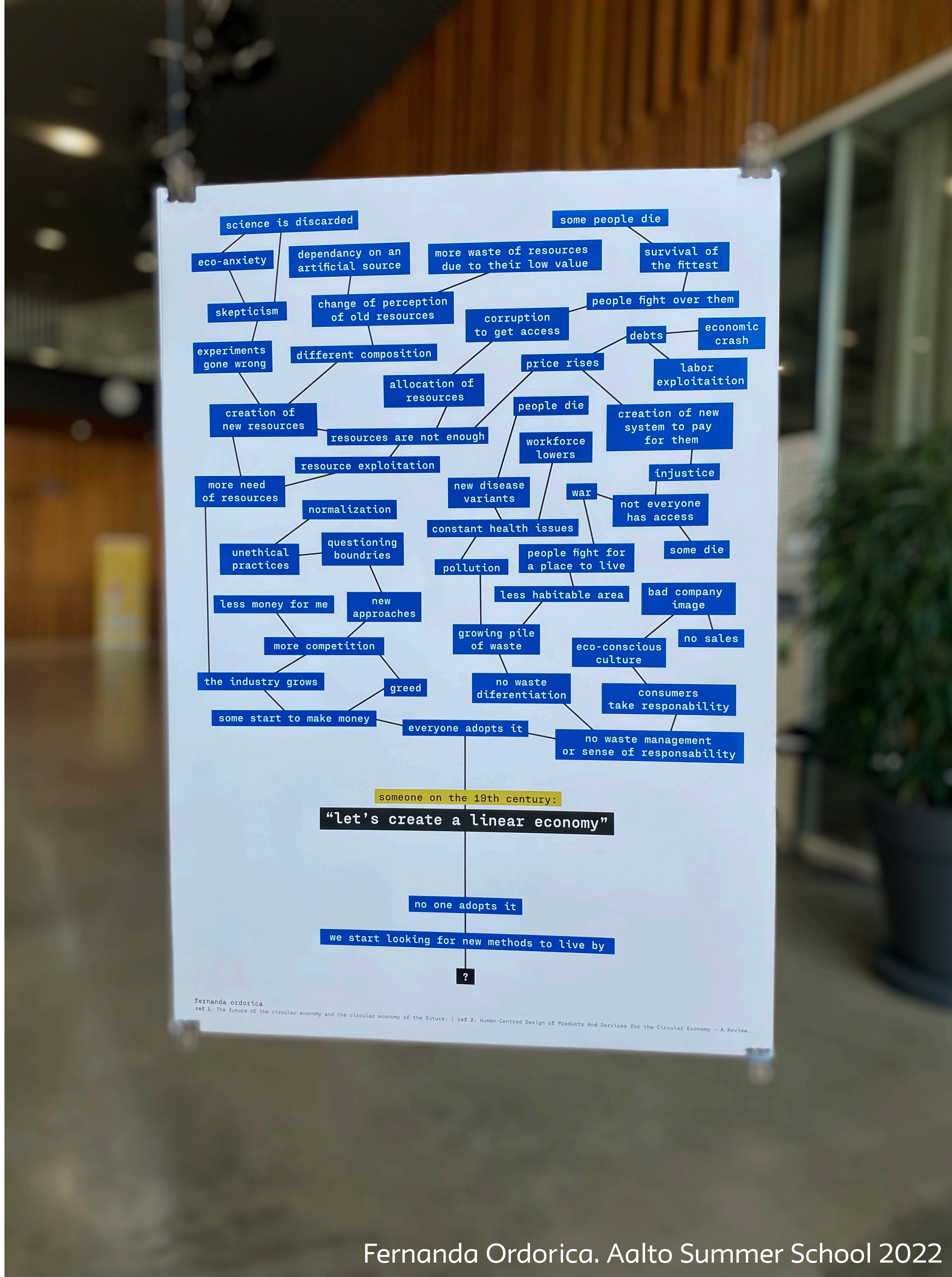
Linear Models vs. Complex Realities



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ENGAGING WITH COMPLEX REALITIES

Reductionism

ENGAGING WITH COMPLEX REALITIES

Reductionism

Struggle across the disciplines

ENGAGING WITH COMPLEX REALITIES

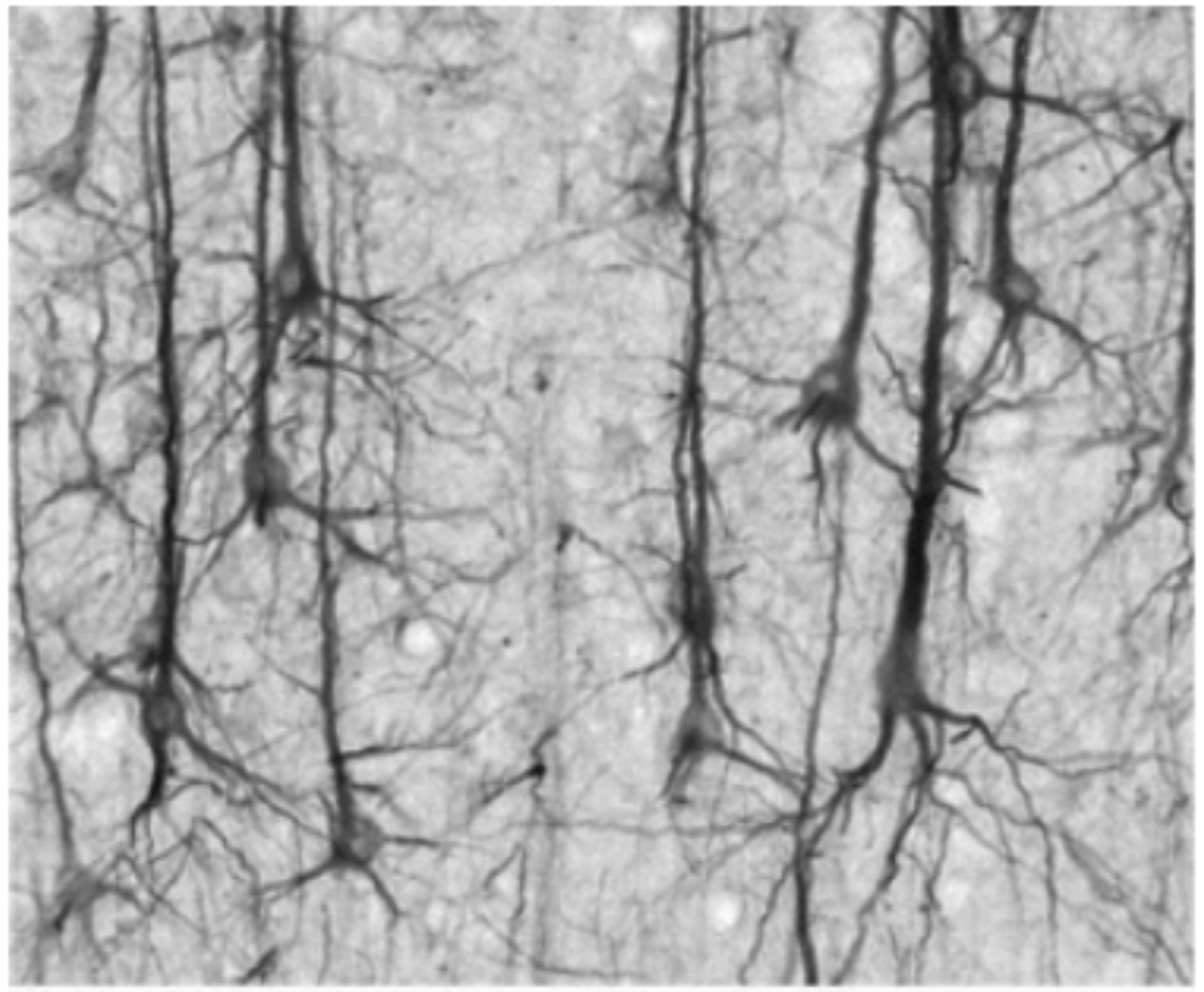
Reductionism

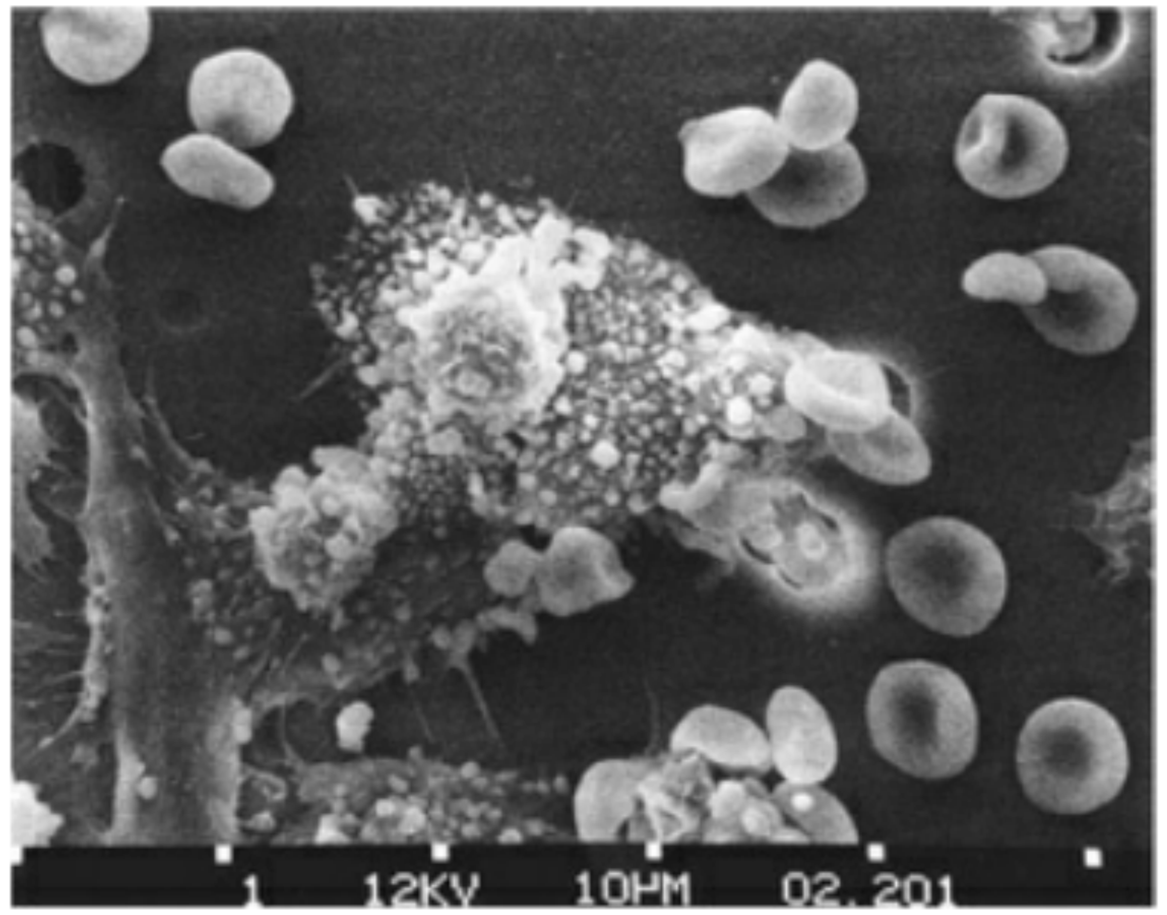
Struggle across the disciplines

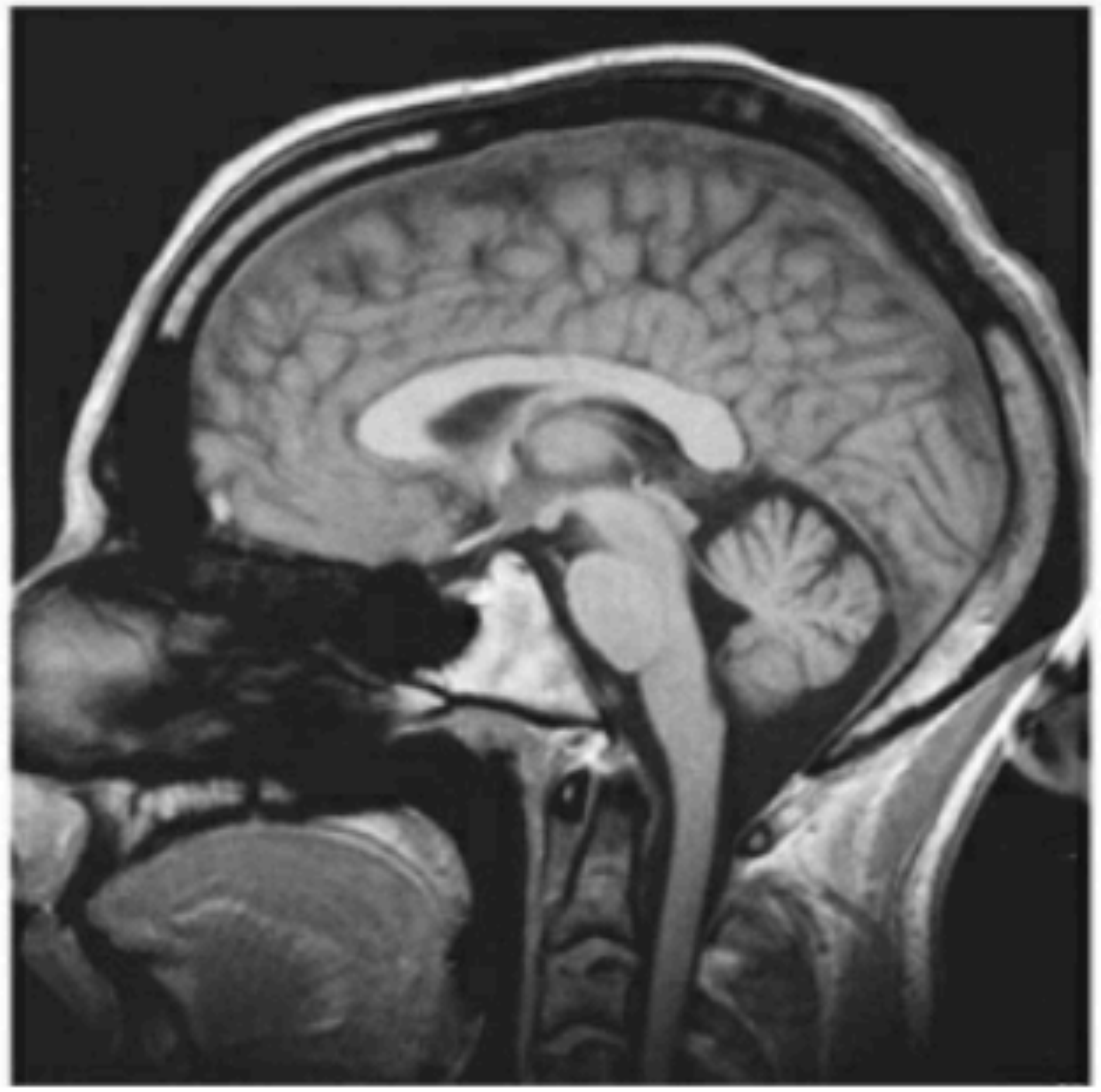
A scientific approach

Complexity Science

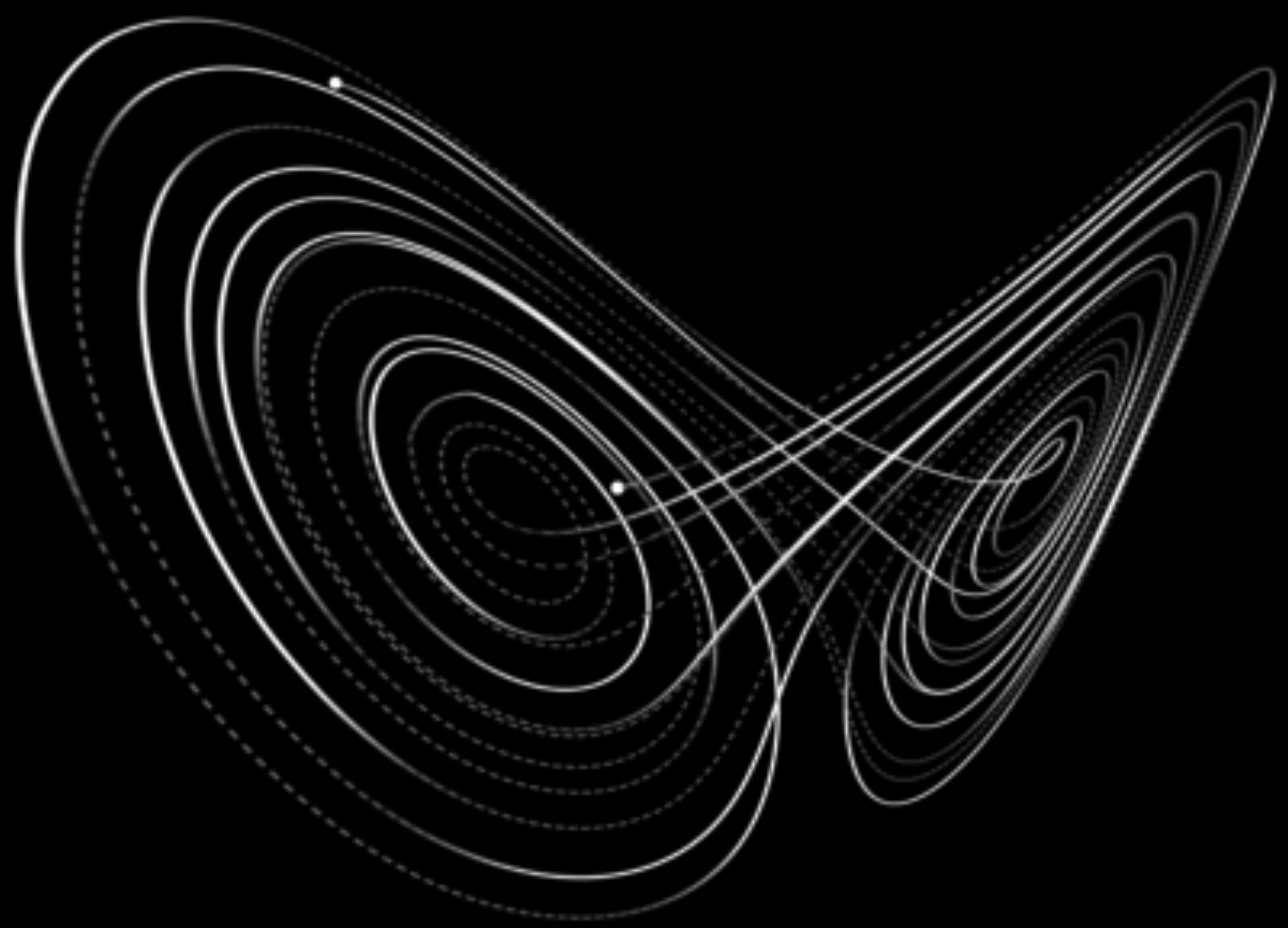
Complexity?







Melanie Mitchell. Complexity: A Guided Tour



A complex phenomena

COMPLEX SYSTEMS

a system where large networks of components

with no central control and simple rules of operation

gives rise to complex collective behavior, sophisticated information processing, and adaptation

through learning or evolution

COMMON PROPERTIES OF COMPLEX SYSTEMS

Collective Behavior

Signal and Information Processing

Adaptation

How can we understand them?

How can we understand them?

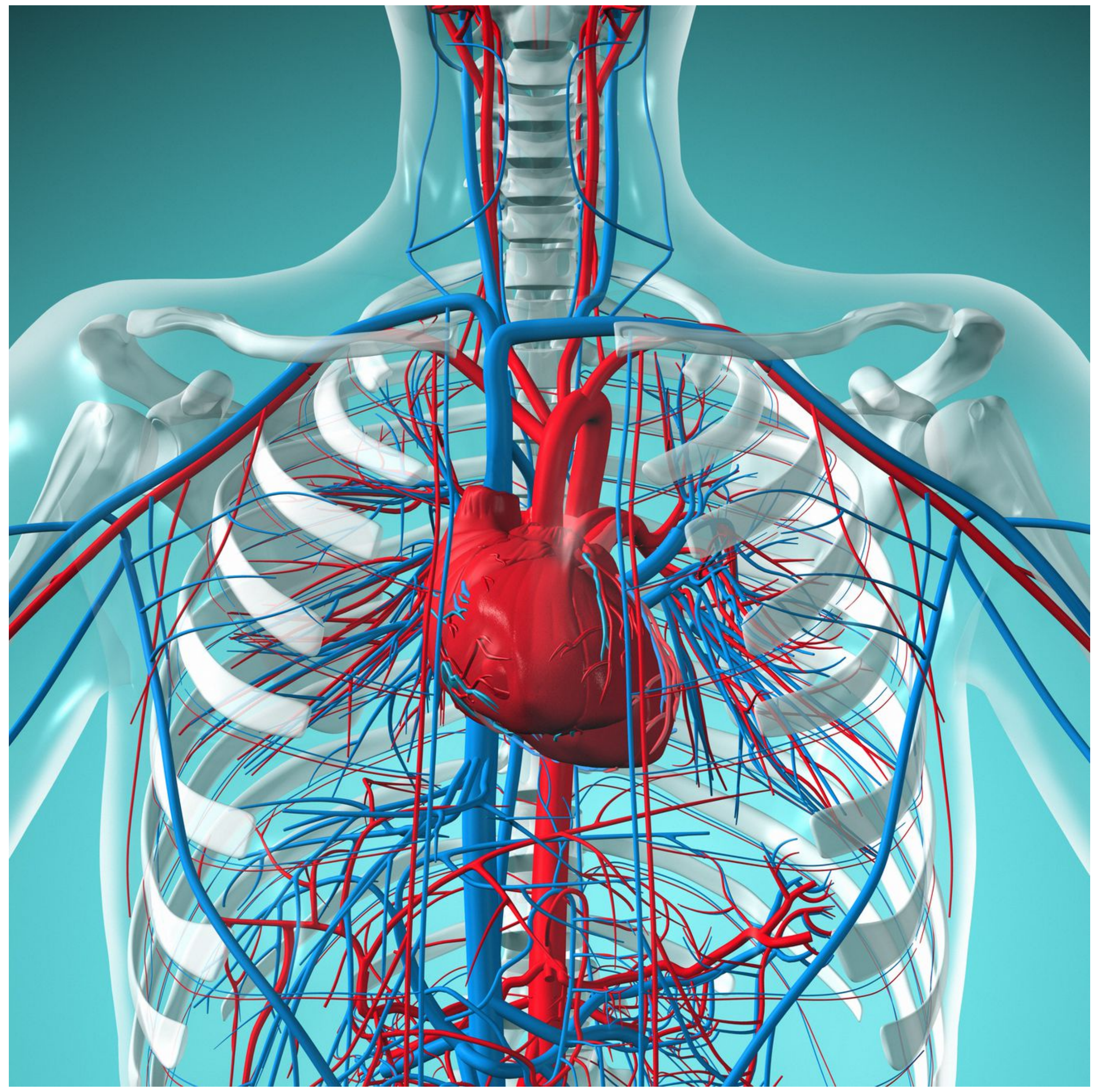
How can we predict them?

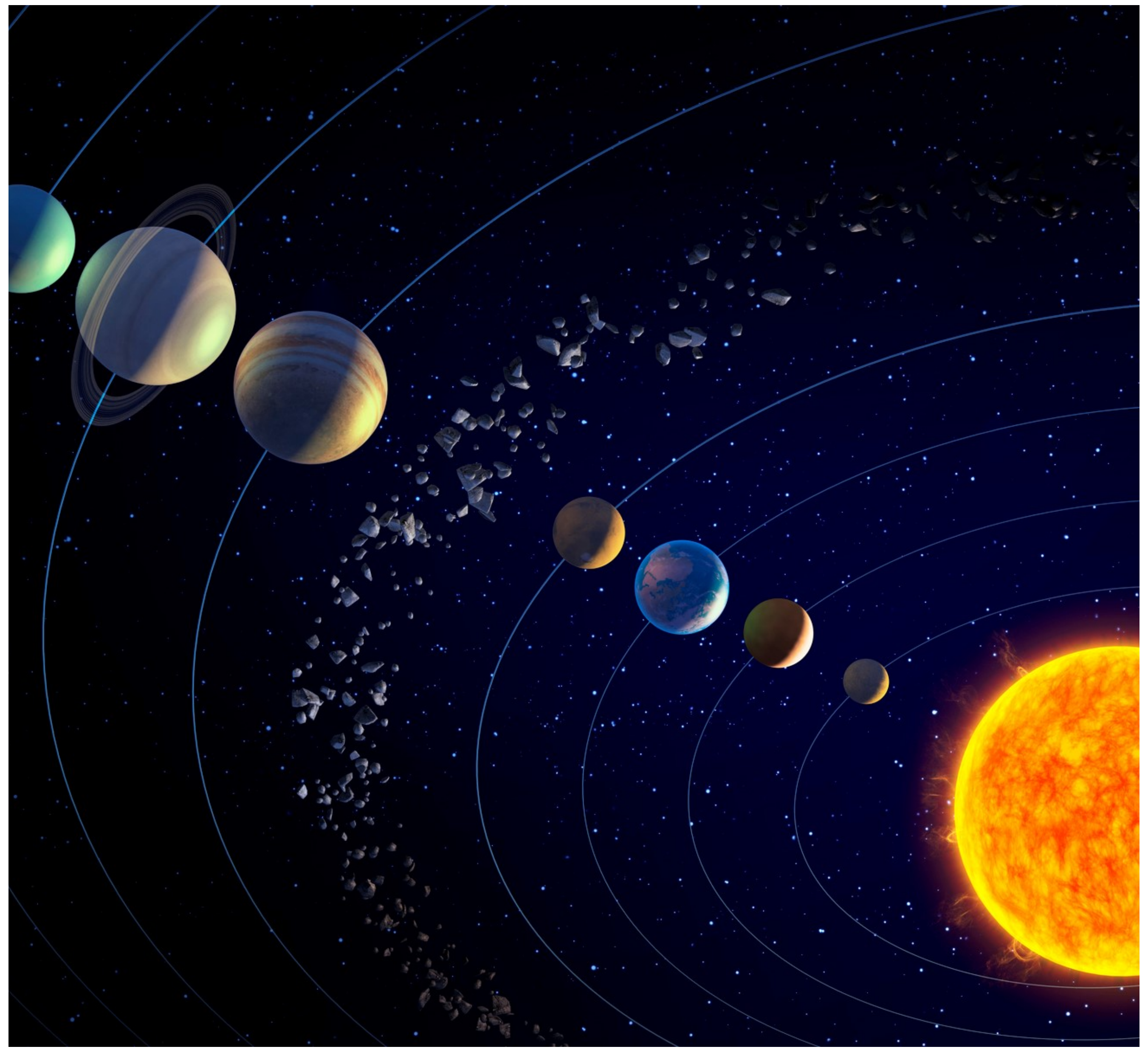
How can we understand them?

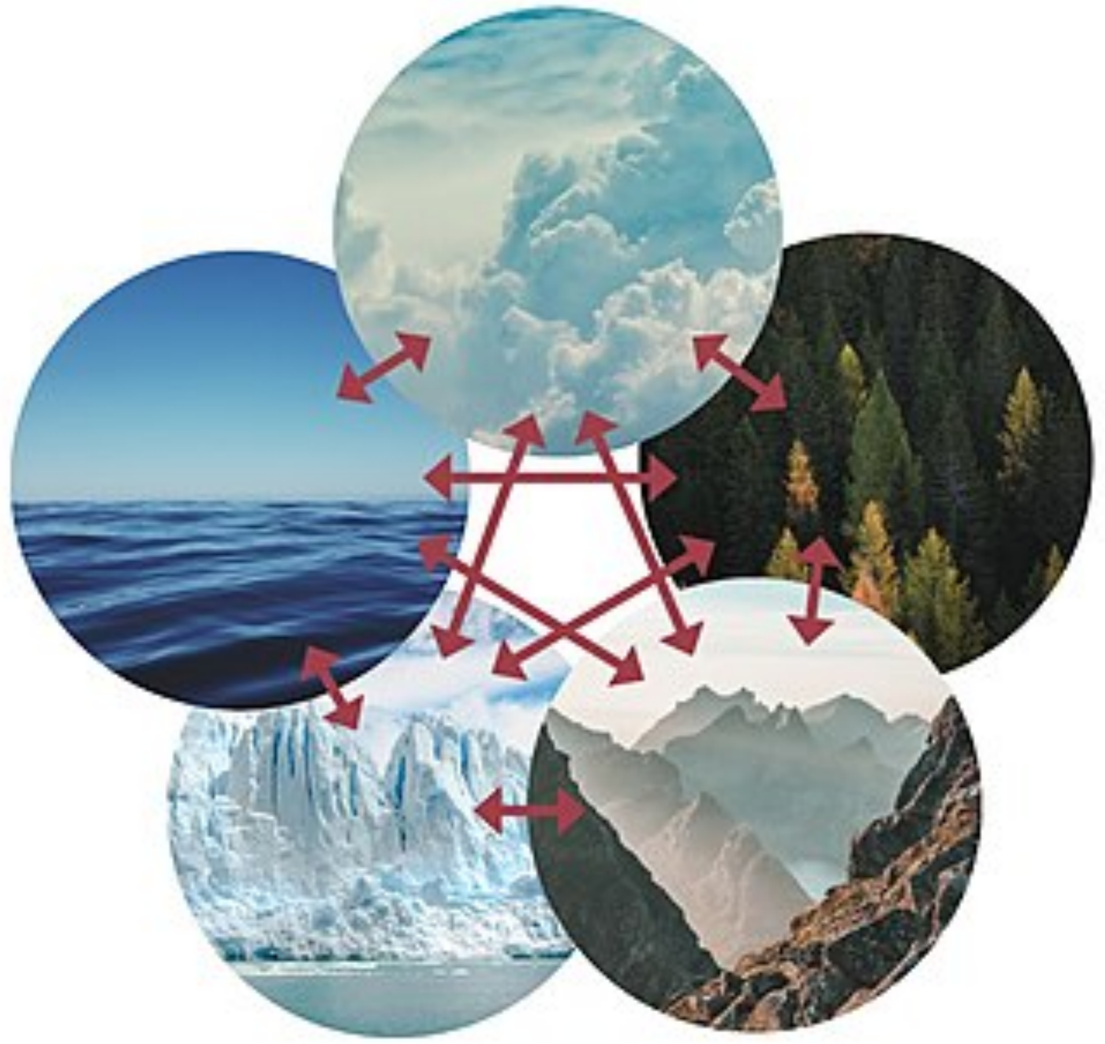
How can we predict them?

How can we design them?

A non-linear dynamical systems







ThoughCo. Space, Wikipedia, Investopedia

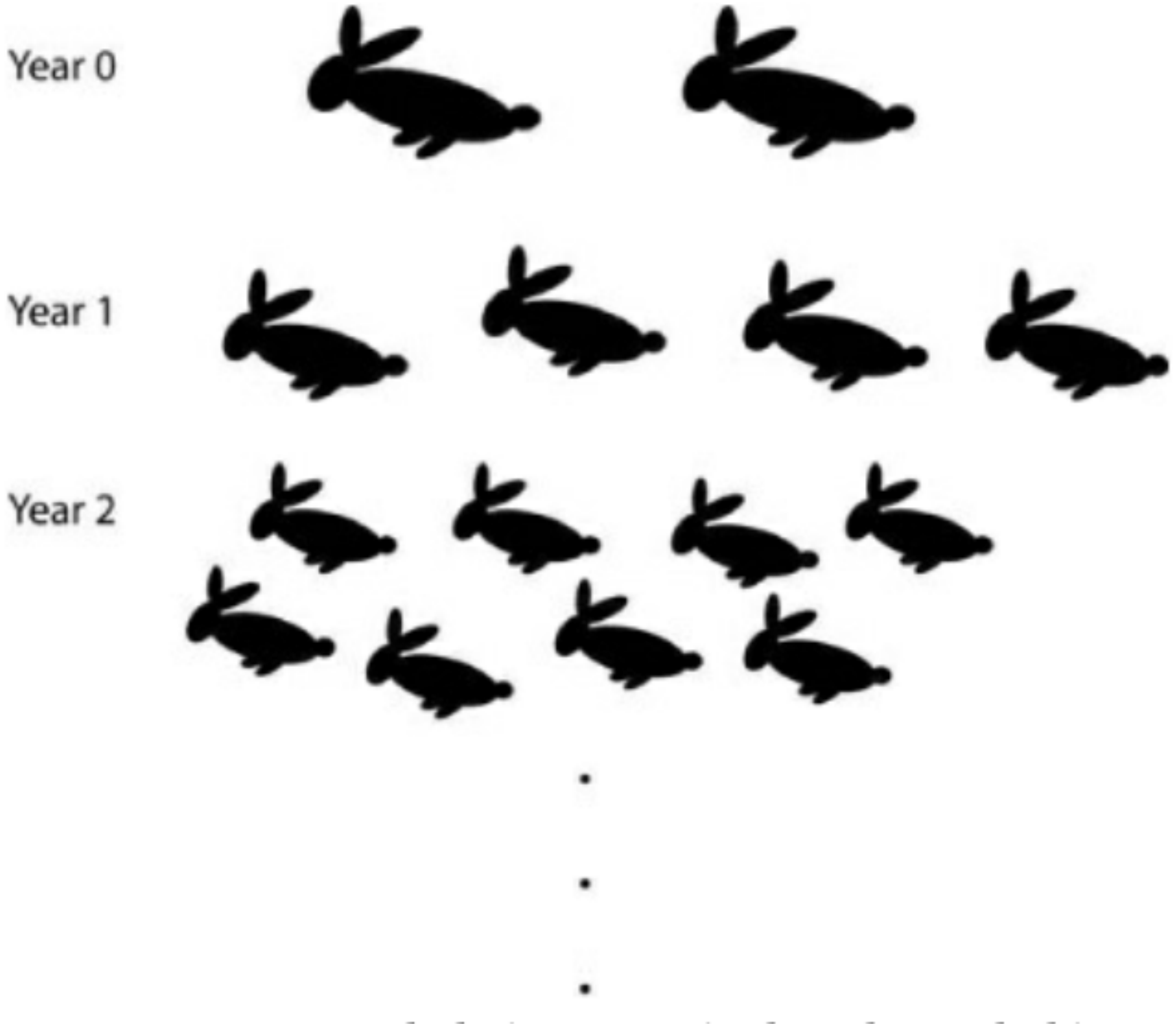
A butterfly effect?

Chaos

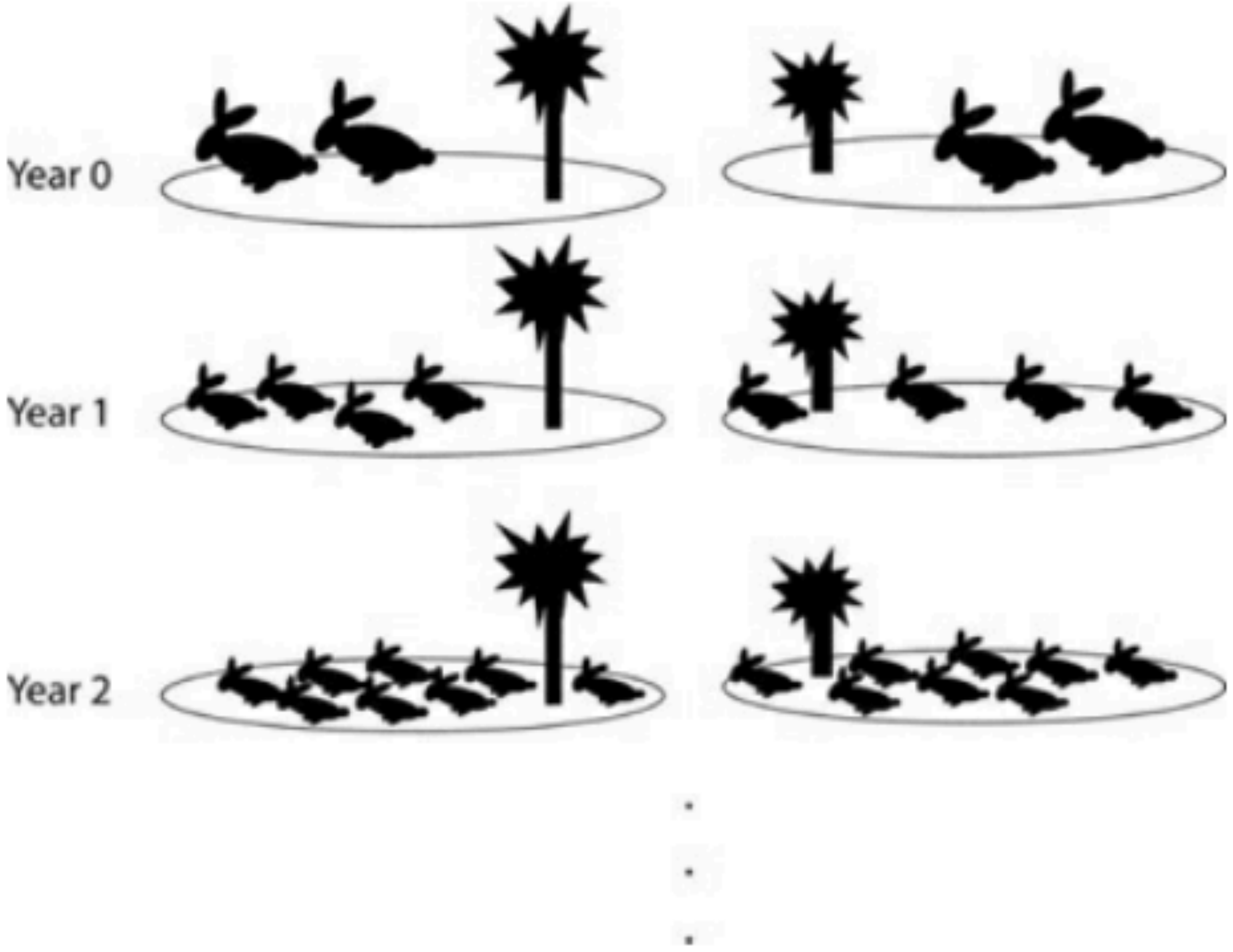
Even minuscule uncertainties in measurements of initial position and momentum can result in huge errors in long-term predictions of these quantities.

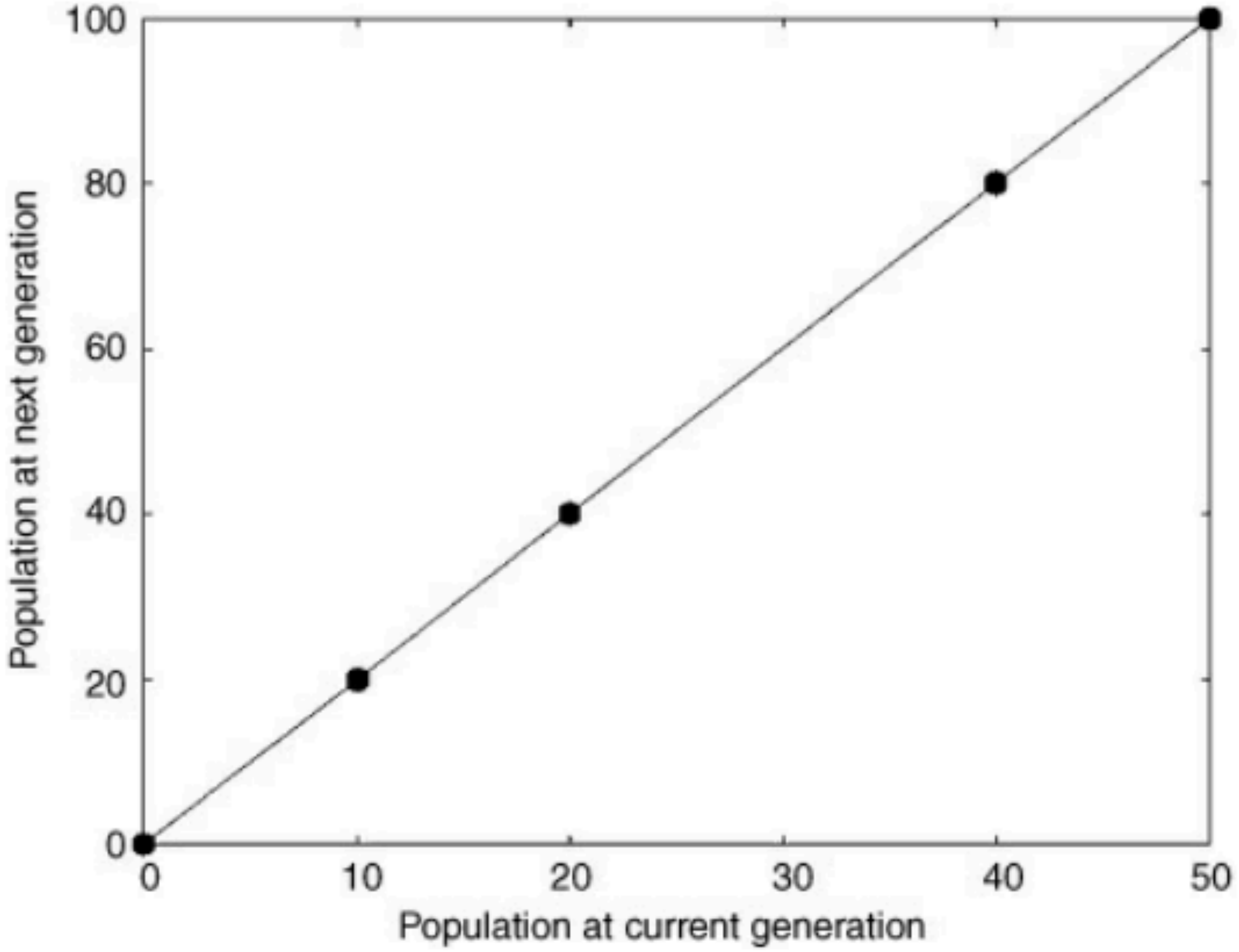
This is known as “sensitive dependence on initial conditions.”

Rabbits with doubling population



A LINEAR SYSTEM





Additional variables

In order to predict the next generation's population:

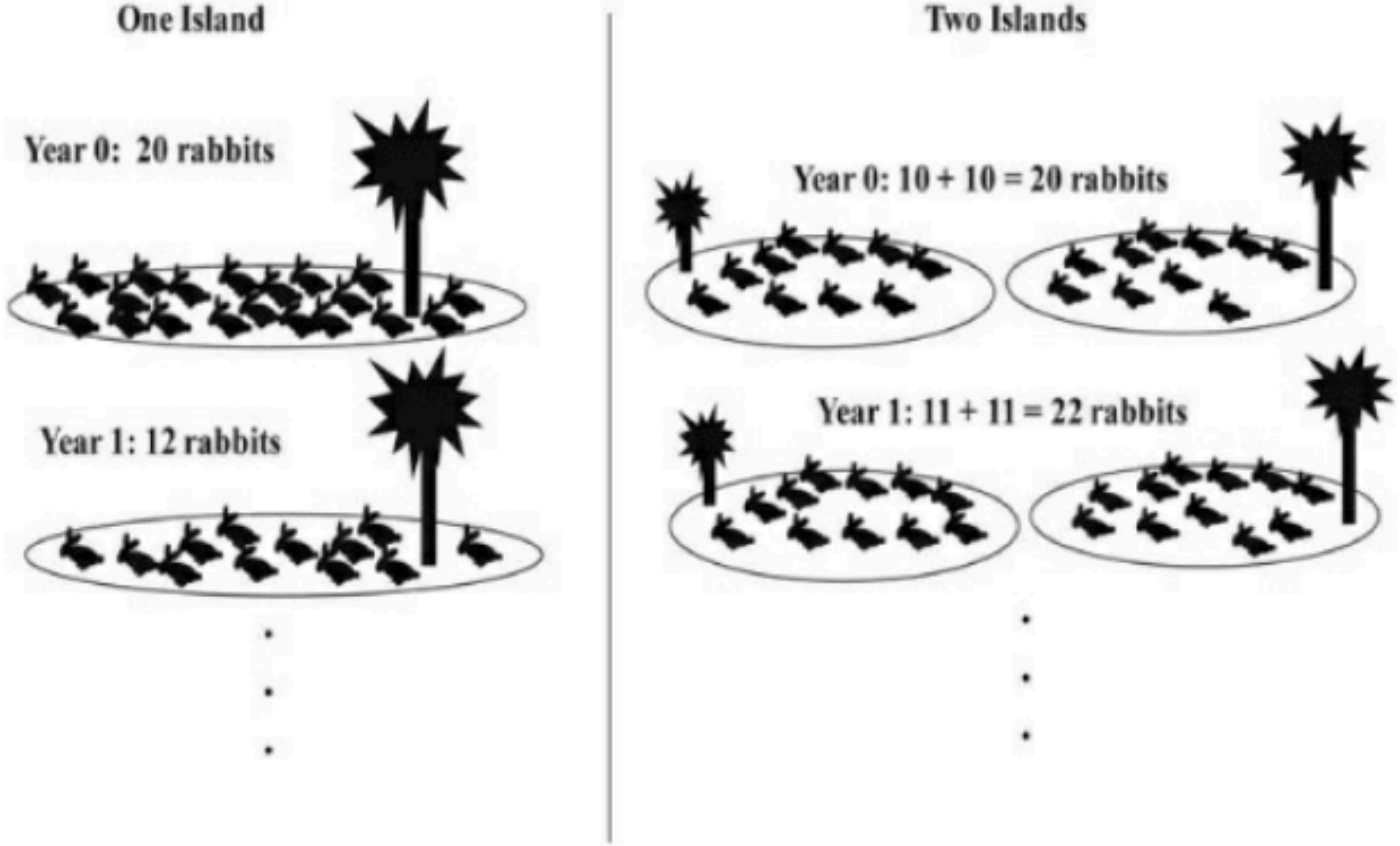
The current generation's population size

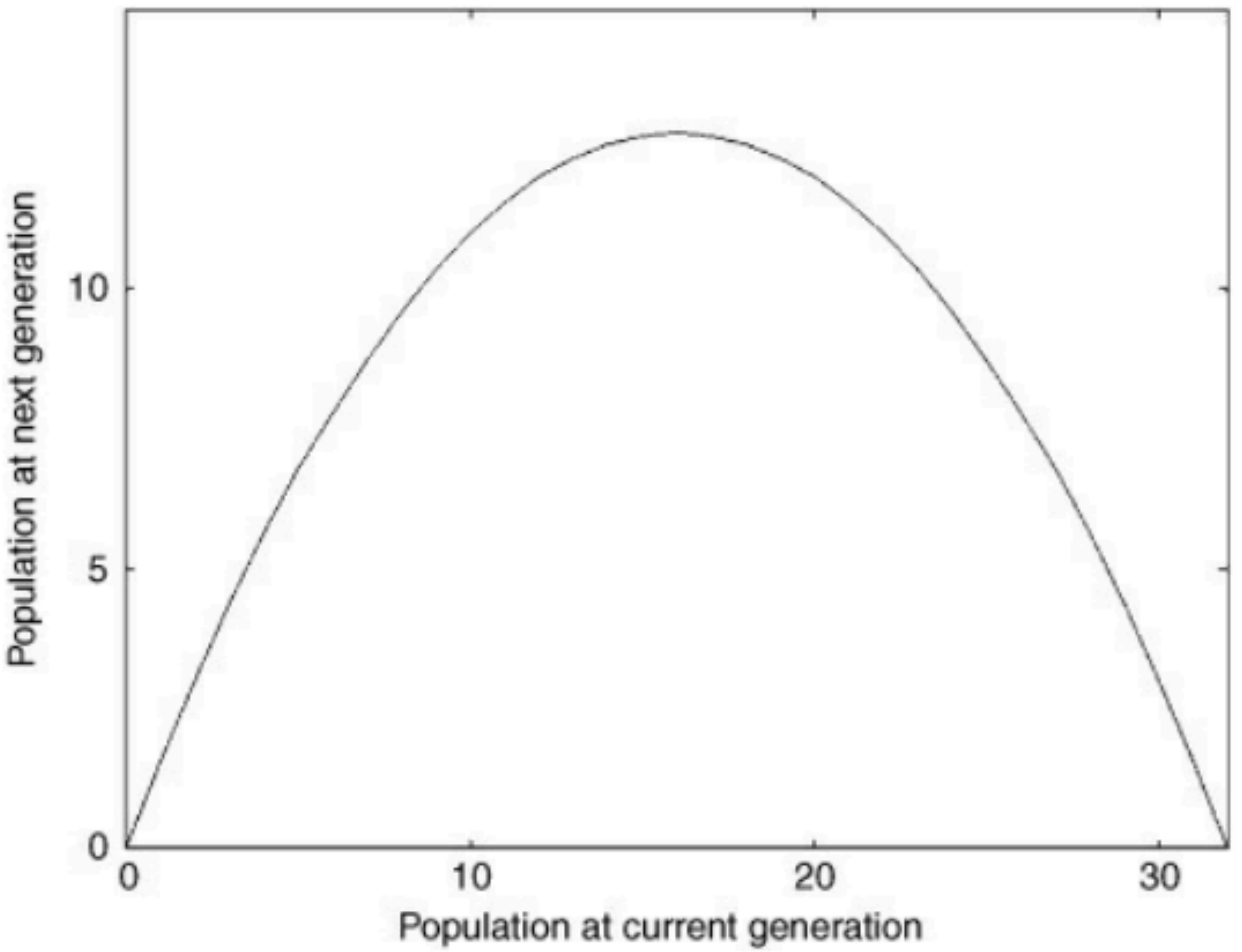
The birth rate

The death rate (due to overcrowding)

The maximum carrying capacity (due to habitat)

A NONLINEAR SYSTEM





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Nonlinear Systems

One in which the whole is different than the sum of the parts

Still deterministic

LOGISTIC MAP: OSCILLATION

$$x_{t+1} = R\,x_t\,(1 - x_t).$$

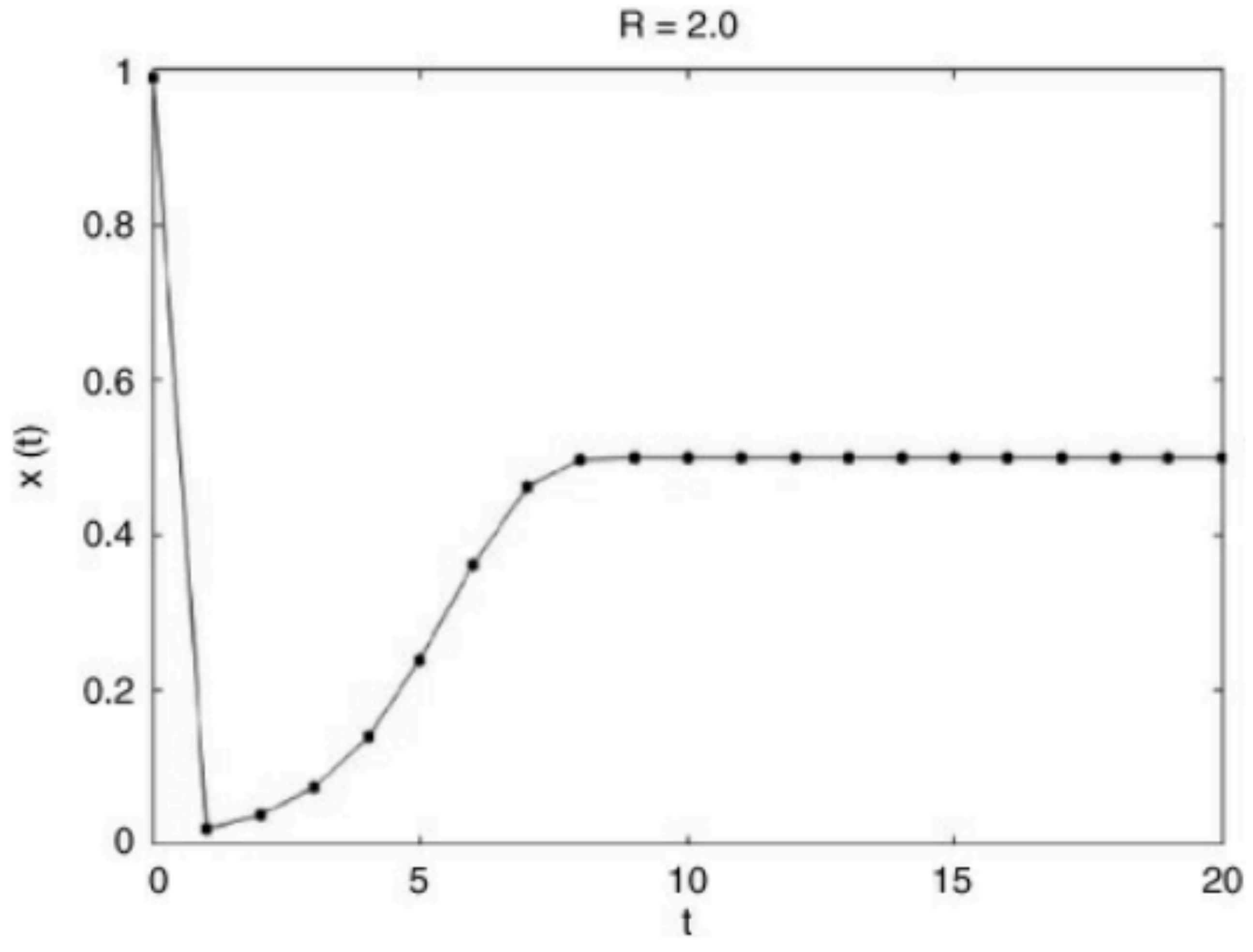


FIGURE 2.7. Behavior of the logistic map for $R = 2$ and $x_0 = 0.99$.

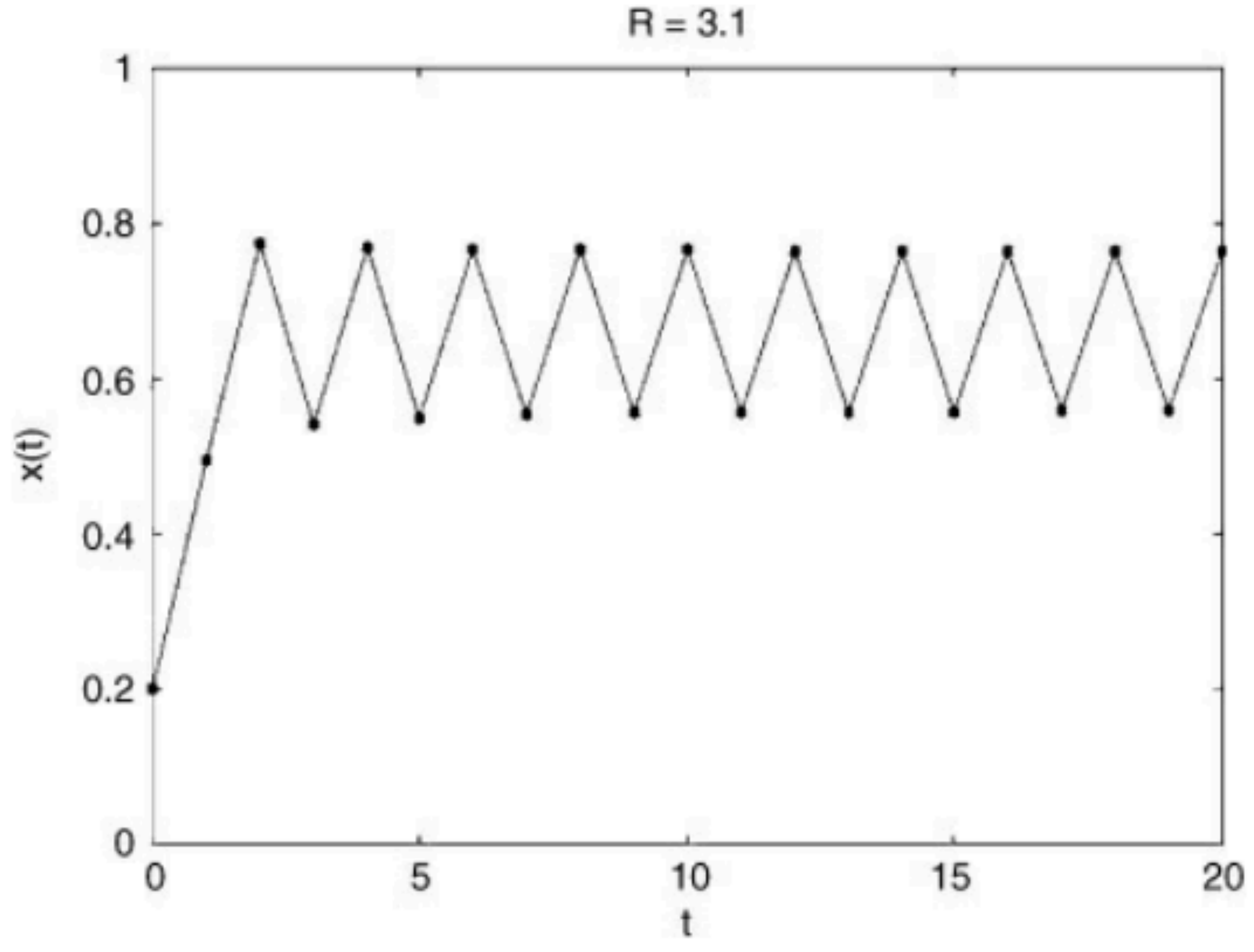


FIGURE 2.8. Behavior of the logistic map for $R = 3.1$ and $x_0 = 0.2$.

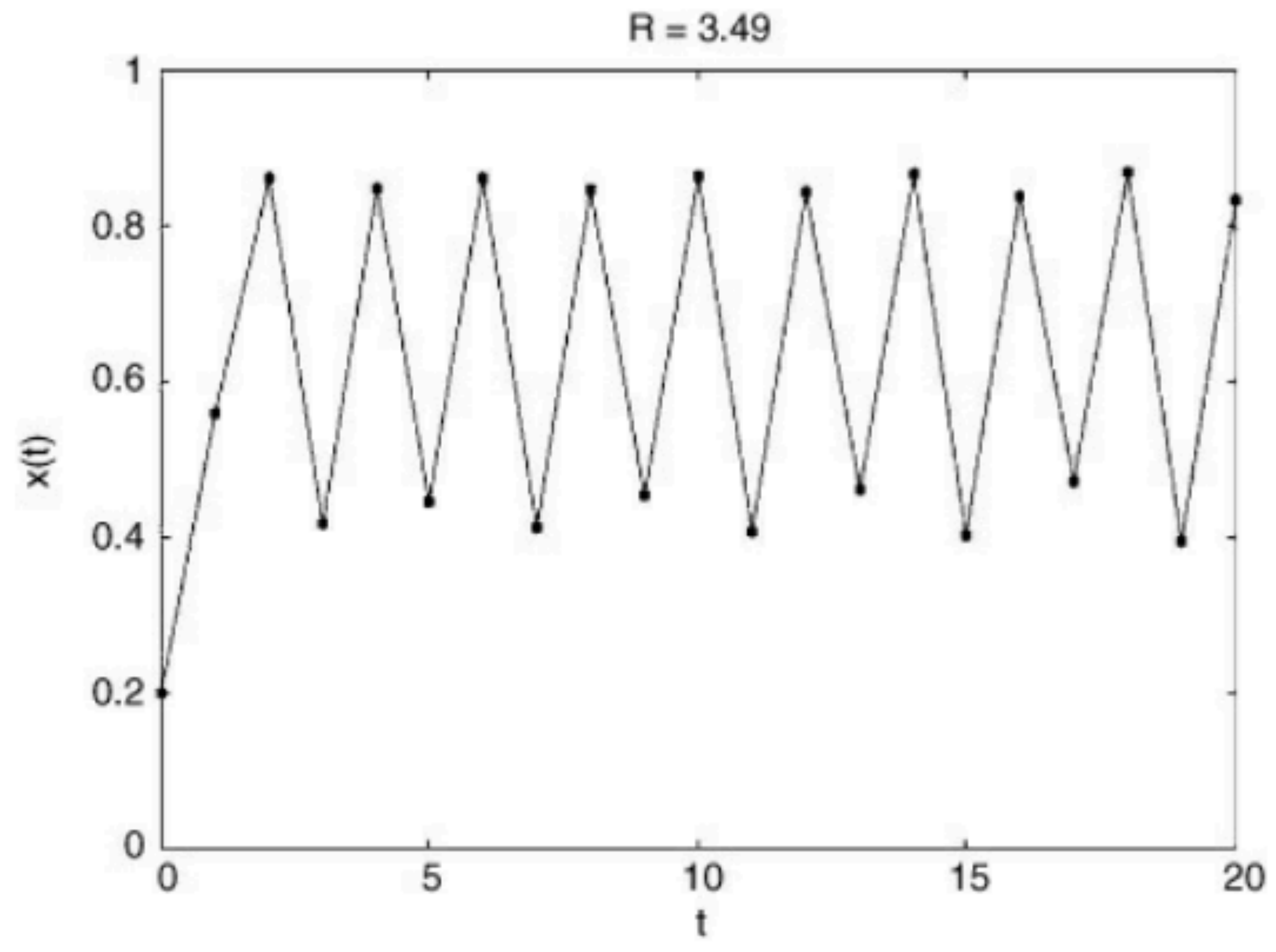


FIGURE 2.9. Behavior of the logistic map for $R = 3.49$ and $x_0 = 0.2$.

Melanie Mitchell. Complexity: A Guided Tour

LOGISTIC MAP: CHAOTIC

$$x_{t+1} = R\, x_t (1 - x_t).$$

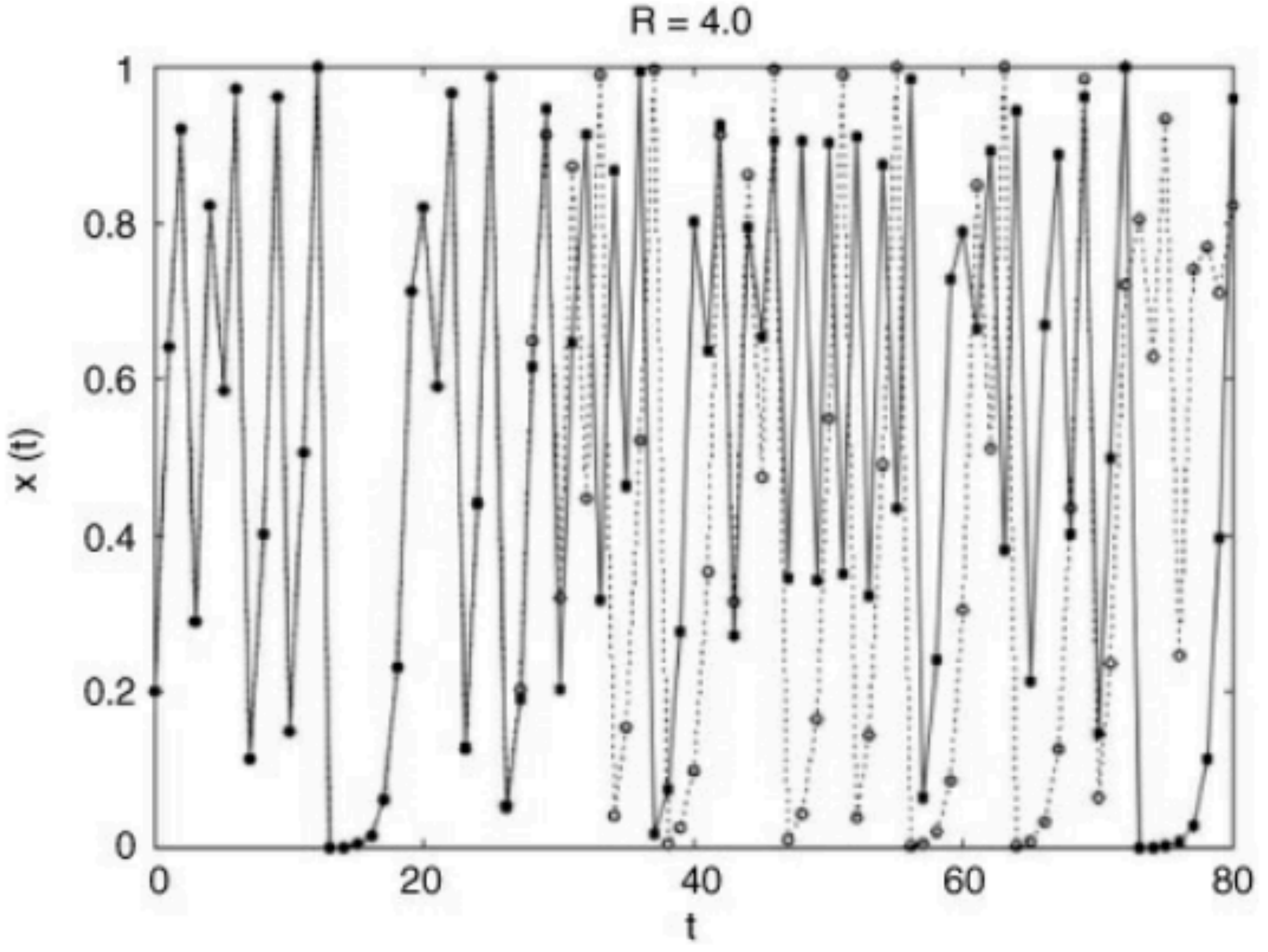


FIGURE 2.10. Two trajectories of the logistic map for $R = 4.0$: $x_0 = 0.2$ and $x_0 = 0.2000000001$.

"the presence of chaos in a system implies that perfect prediction à la Laplace is impossible not only in practice but also in principle, since we can never know x0 to infinitely many decimal places.

This is a profound negative result that, along with quantum mechanics, helped wipe out the optimistic nineteenth-century view of a clockwork Newtonian universe that ticked along its predictable path."

Universal Behavior

R = 3.569946

Doubling x 4.6692016

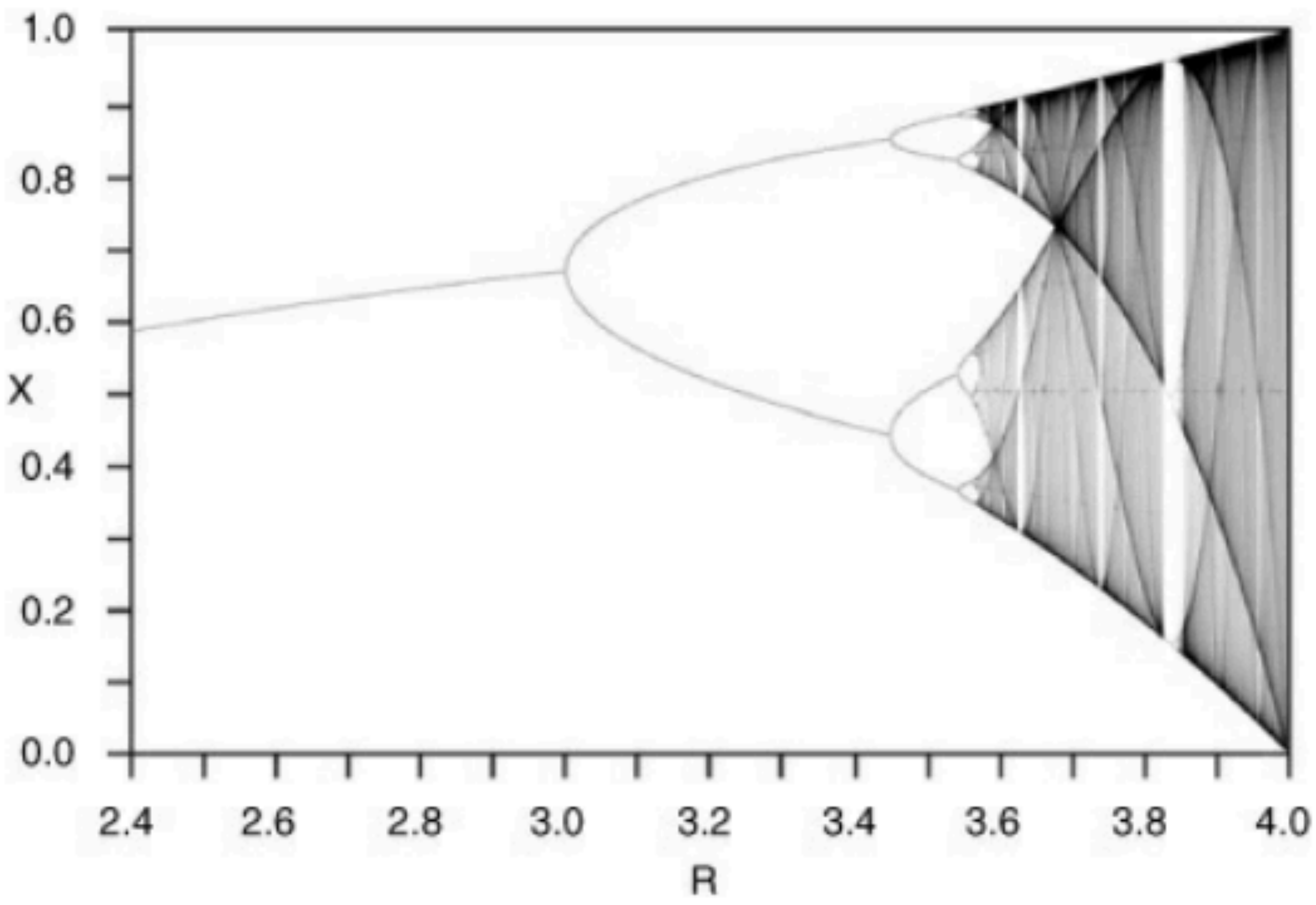
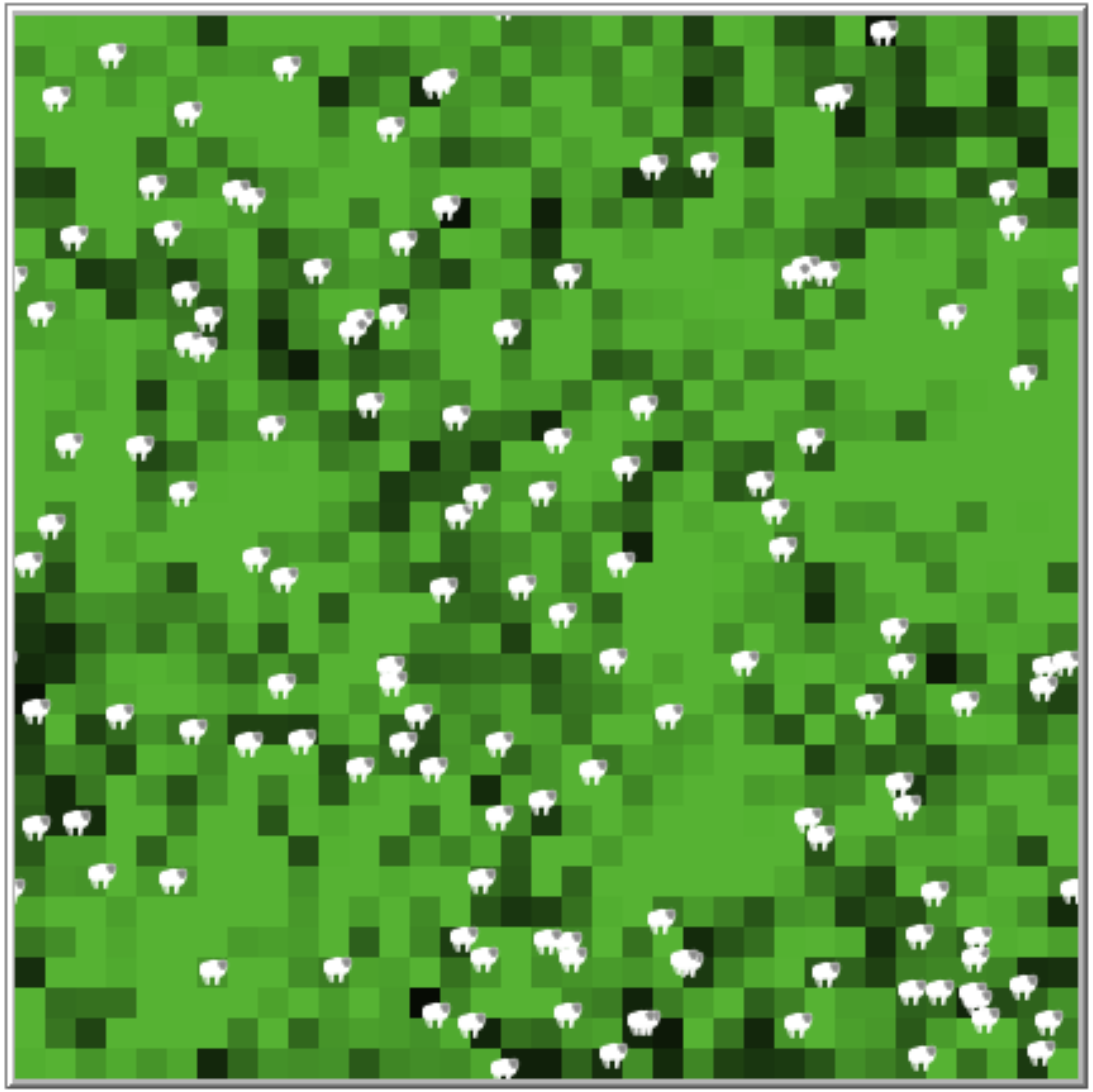


FIGURE 2.11. Bifurcation diagram for the logistic map, with attractor plotted as a function of *R*.



http://www.netlogoweb.org/launch#http://www.netlogoweb.org/assets/modelslib/Sample%20Models/Biology/Wolf%20Sheep%20Predation.nlogo

Is the world fully Un-knowable?

Is the world fully Un-knowable?

Seemingly random behavior can emerge from deterministic systems without an external source of randomness.

The behavior of simple, deterministic systems can be impossible, even in theory, to predict in the long term due to sensitive dependence on initial conditions.

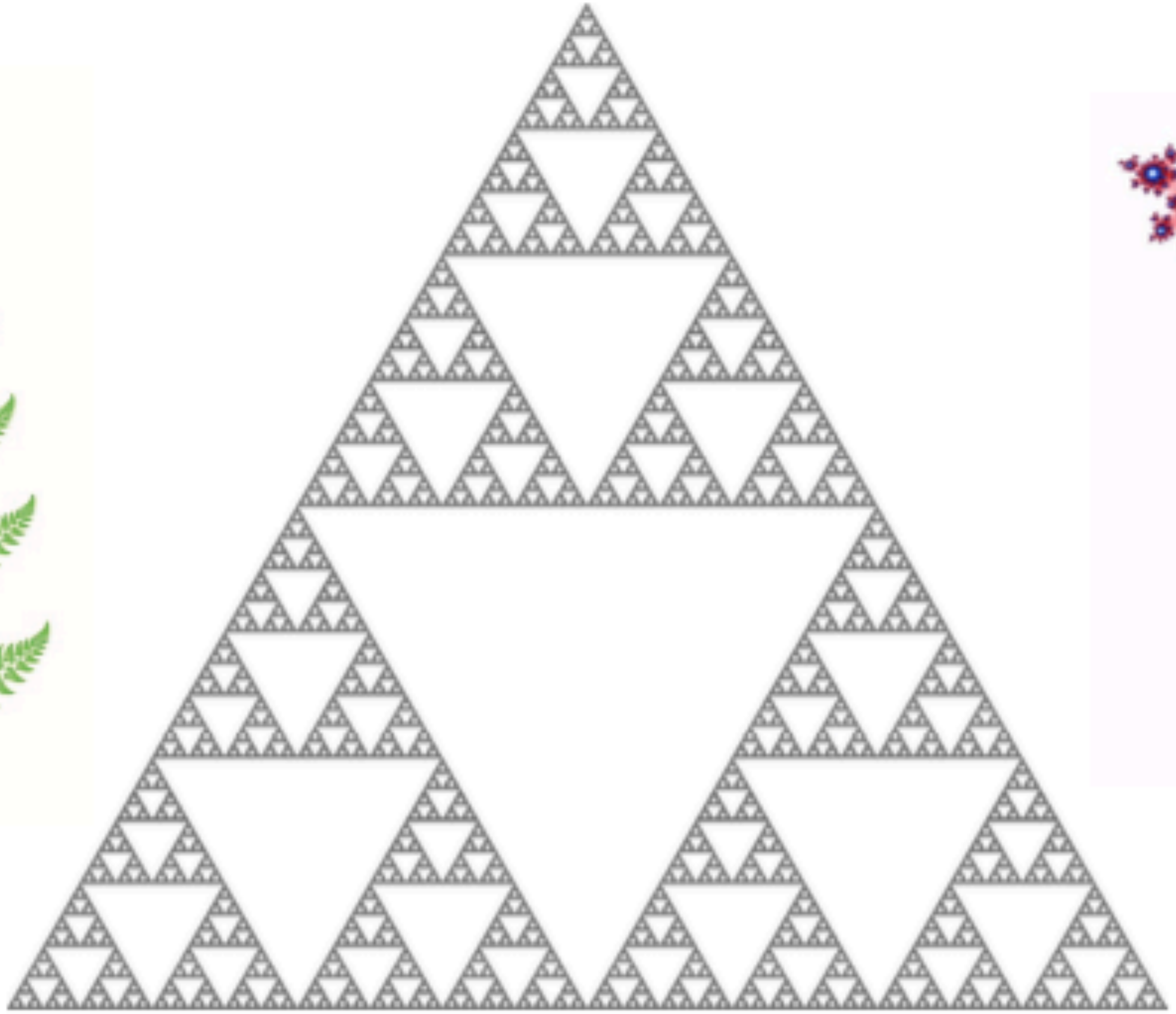
Although the detailed behavior of a chaotic system cannot be predicted, there is some “order in chaos” seen in universal properties common to large sets of chaotic systems like the period-doubling route to chaos and Feigenbaum’s constant.

Even though “prediction becomes impossible” at the detailed level, there are some higher-level aspects of chaotic systems that are indeed predictable

Self-Similarity

In Nature

In Geometry



In Algebra

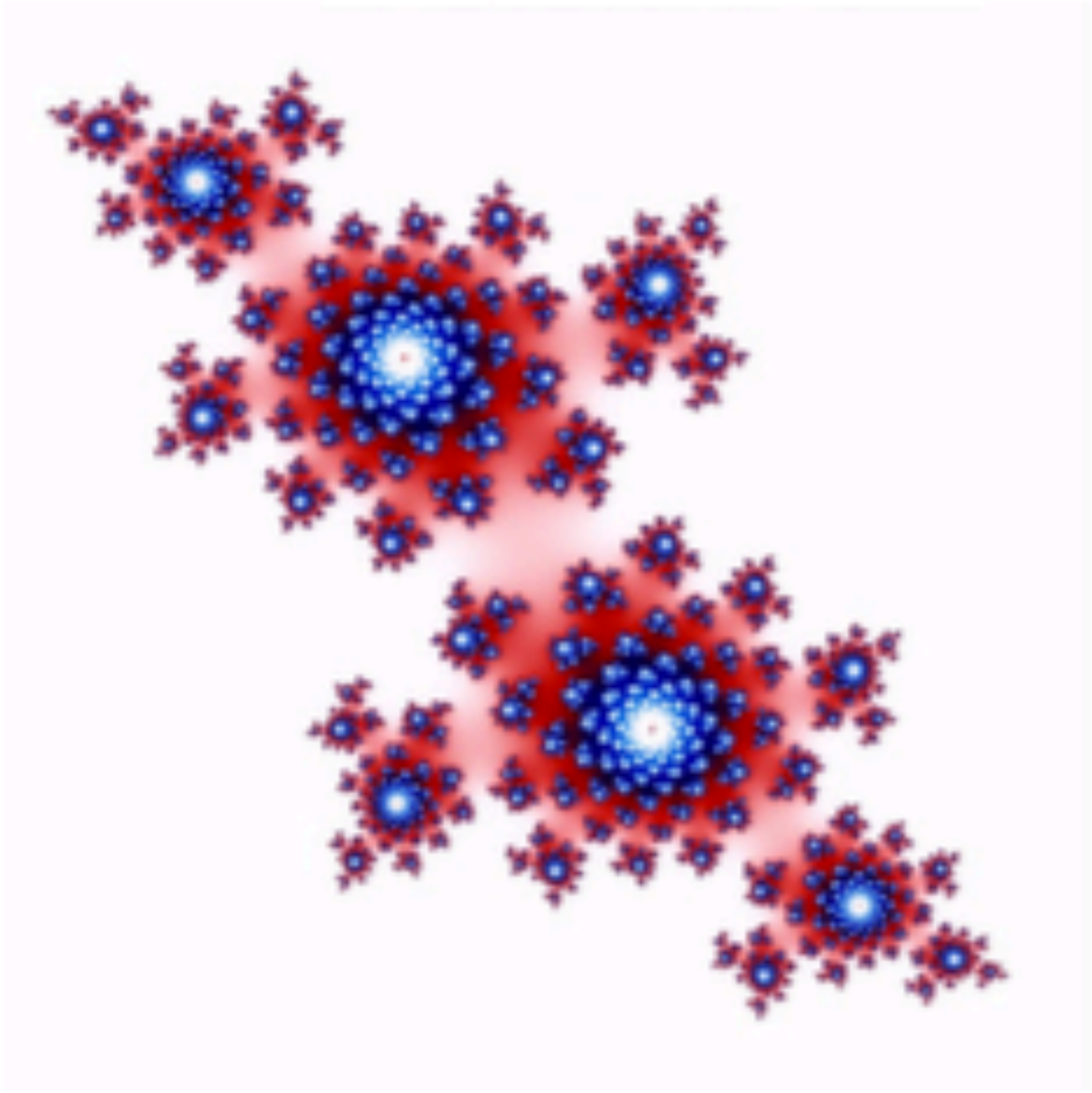
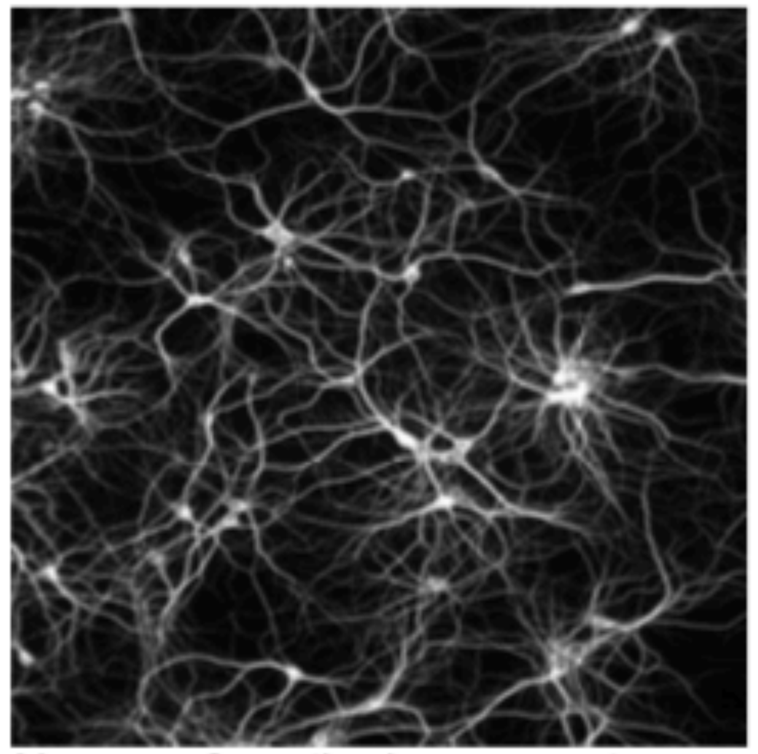


Image Sources: Fractal Foundation

Fractals Natural

BRANCHING

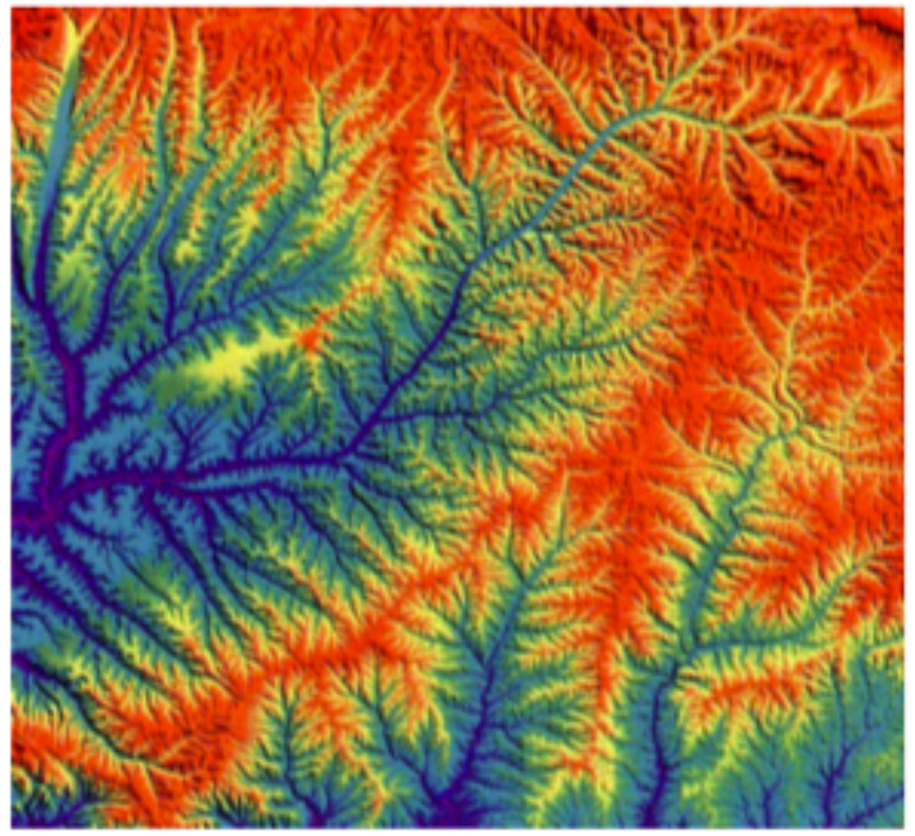


Neurons from the human cortex. The branching of our brain cells creates the incredibly complex network that is responsible for all we perceive, imagine, remember. Scale = 100 microns = 10^{-4} m.

Our lungs are branching fractals with a surface area ~100 m^2. The similarity to a tree is significant, as lungs and trees both use their large surface areas to exchange oxygen and CO_2. Scale = 30 cm = $3*10^{-1}$ m.

Lichtenberg "lightning", formed by rapidly discharging electrons in lucite. Scale = 10 cm = 10^{-1} m.

Oak tree, formed by a sprout branching, and then each of the branches branching again, etc. Scale = 30 m = $3*10^{1}$ m.



River network in China, formed by erosion from repeated rainfall flowing downhill for millions of years. Scale = 300 km = $3*10^{5}$ m.

Image Sources: Fractal Foundation

Fractals Natural

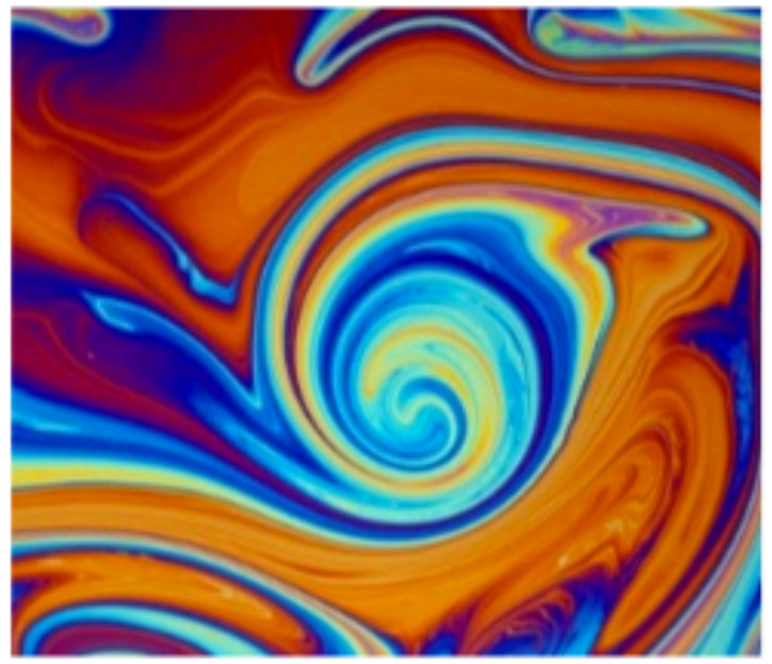
SPIRALS

A fossilized ammonite from 300 million years ago. A simple, primitive organism, it built its spiral shell by adding pieces that grow and twist at a constant rate. Scale = 1 m.

A hurricane is a self-organizing spiral in the atmosphere, driven by the evaporation and condensation of sea water. Scale = 500 km = $5*10^5$ m.

A spiral galaxy is the largest natural spiral comprising hundreds of billions of stars. Scale = 100,000 ly = ~10^{20} m.

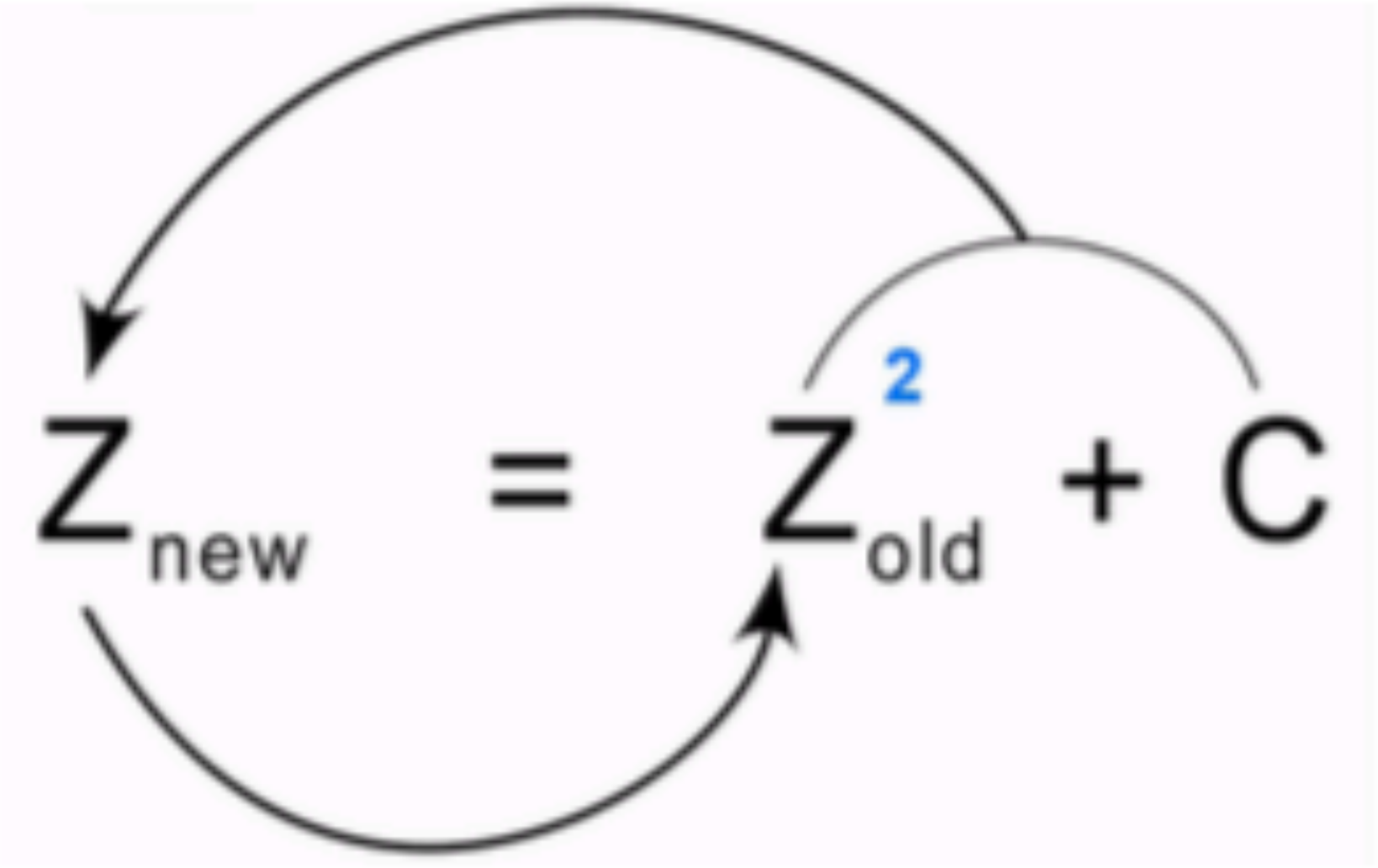
The plant kingdom is full of spirals. An agave cactus forms its spiral by growing new pieces rotated by a fixed angle. Many other plants form spirals in this way, including sunflowers, pinecones, etc. Scale = 50 cm = $5*10^{-1}$ m.



The turbulent motion of fluids creates spirals in systems ranging from a soap film to the oceans, atmosphere and the surface of jupiter. Scale = 5 mm = $5*10^{-3}$ m.

A fiddlehead fern is a self-similar plant that forms as a spiral of spirals of spirals. Scale = 5 cm = $5*10^{-2}$ m.

Fractals Algebraic



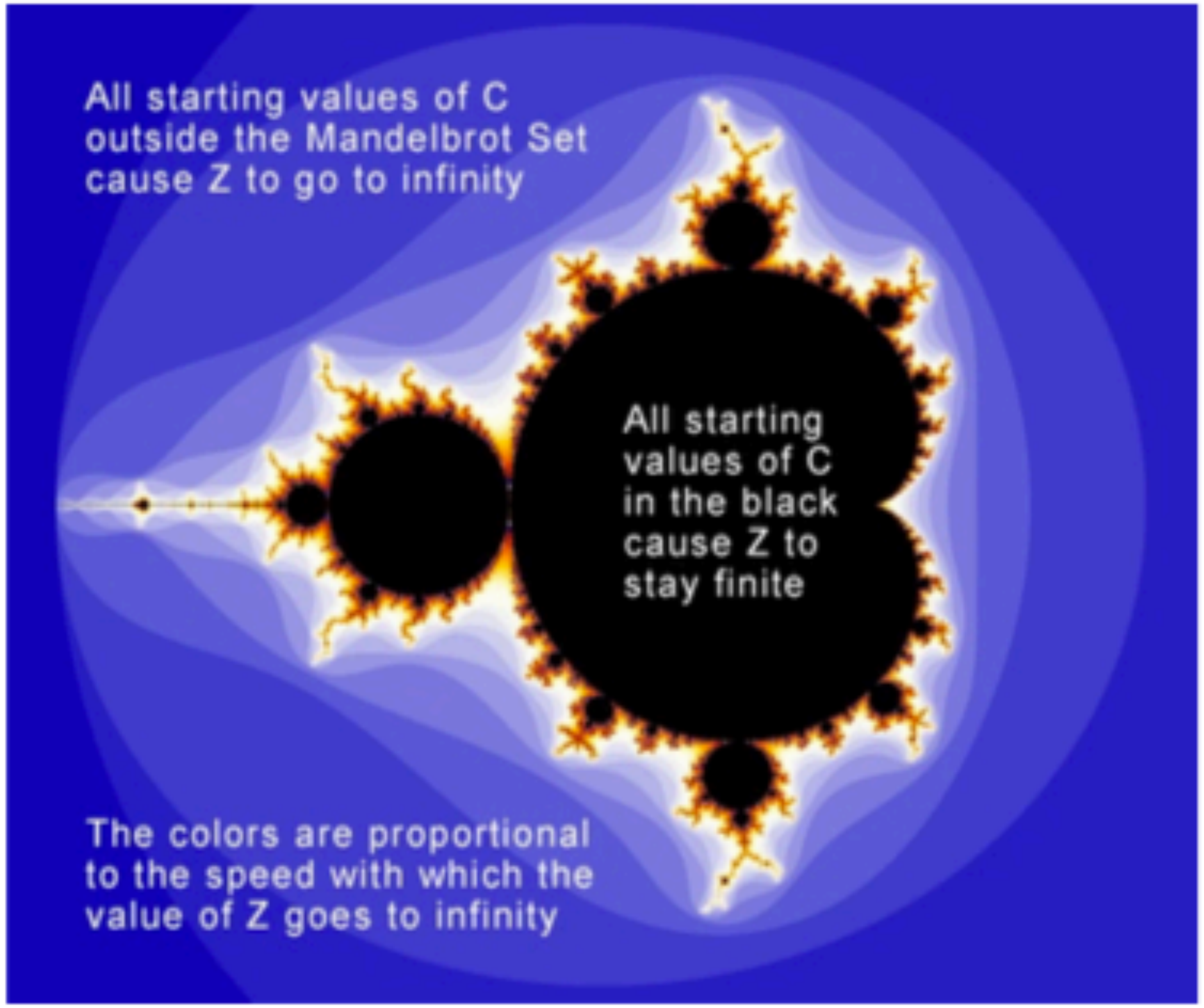


Image Sources: Fractal Foundation

Patterns & Symmetry

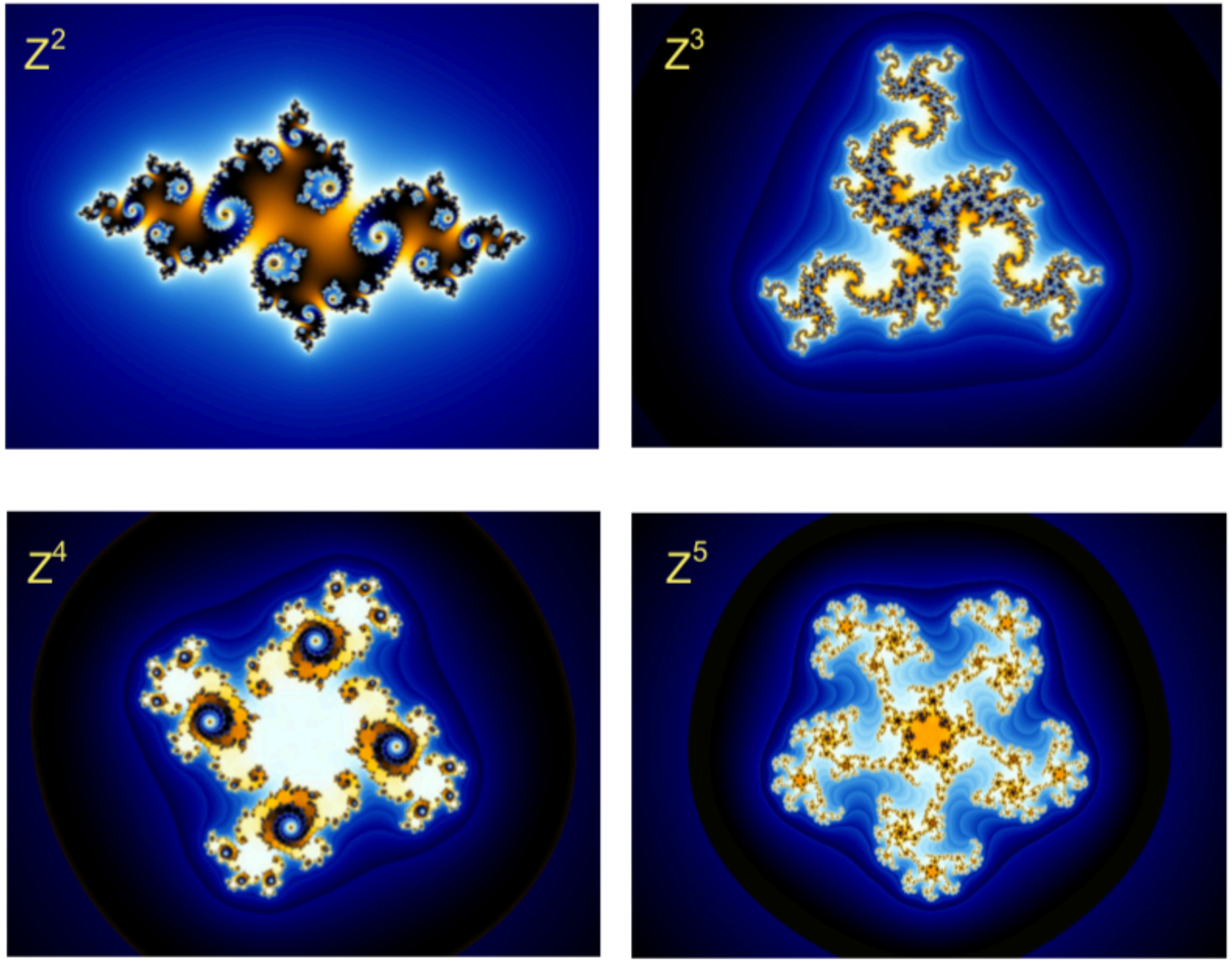
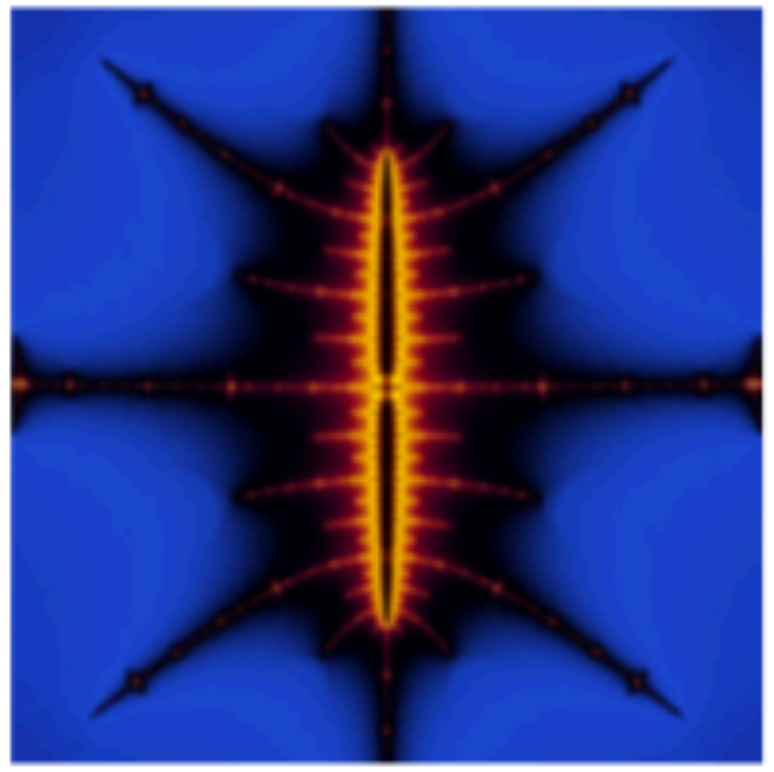
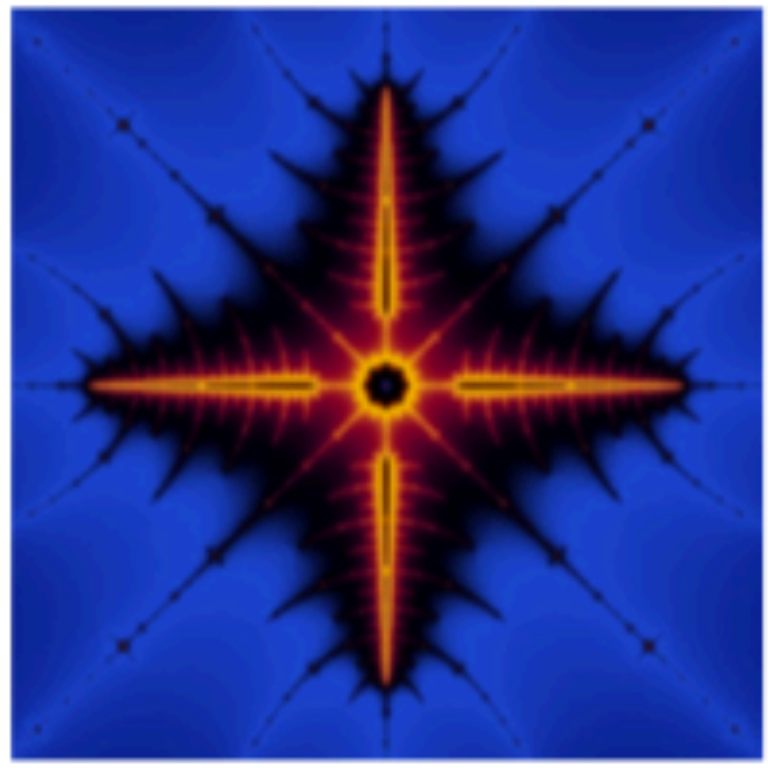


Image Sources: Fractal Foundation

Patterns & Symmetry

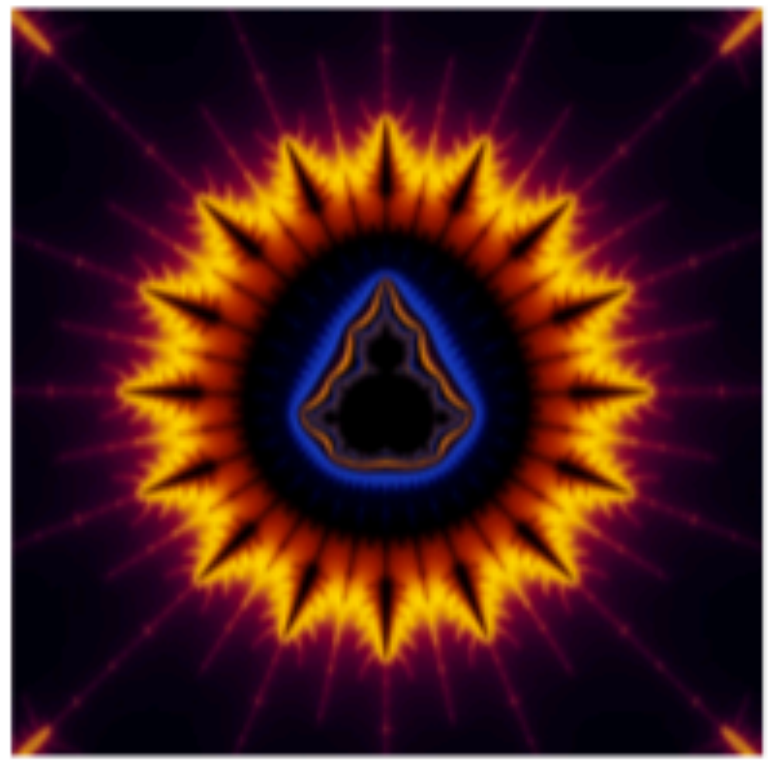
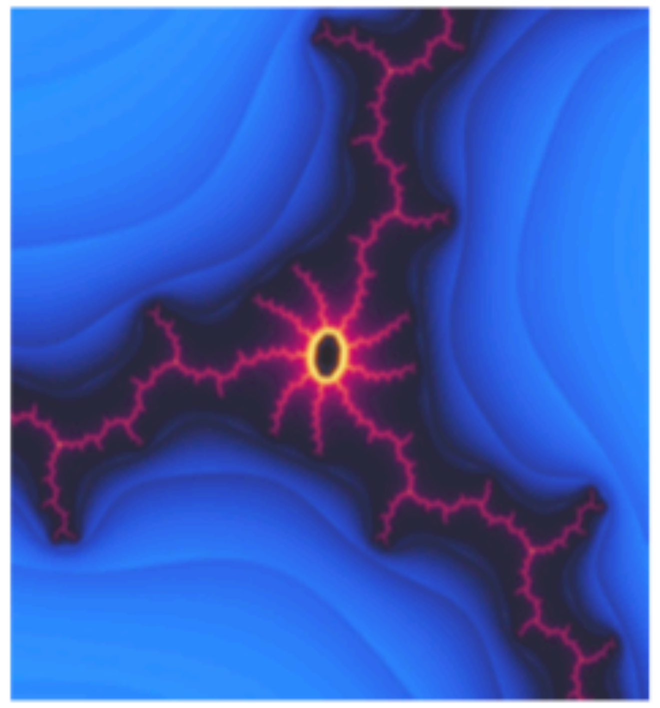
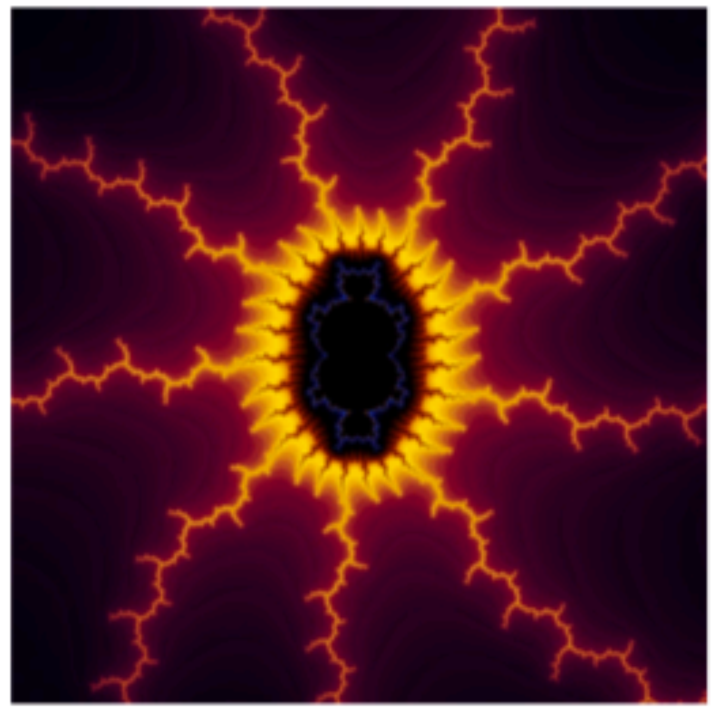
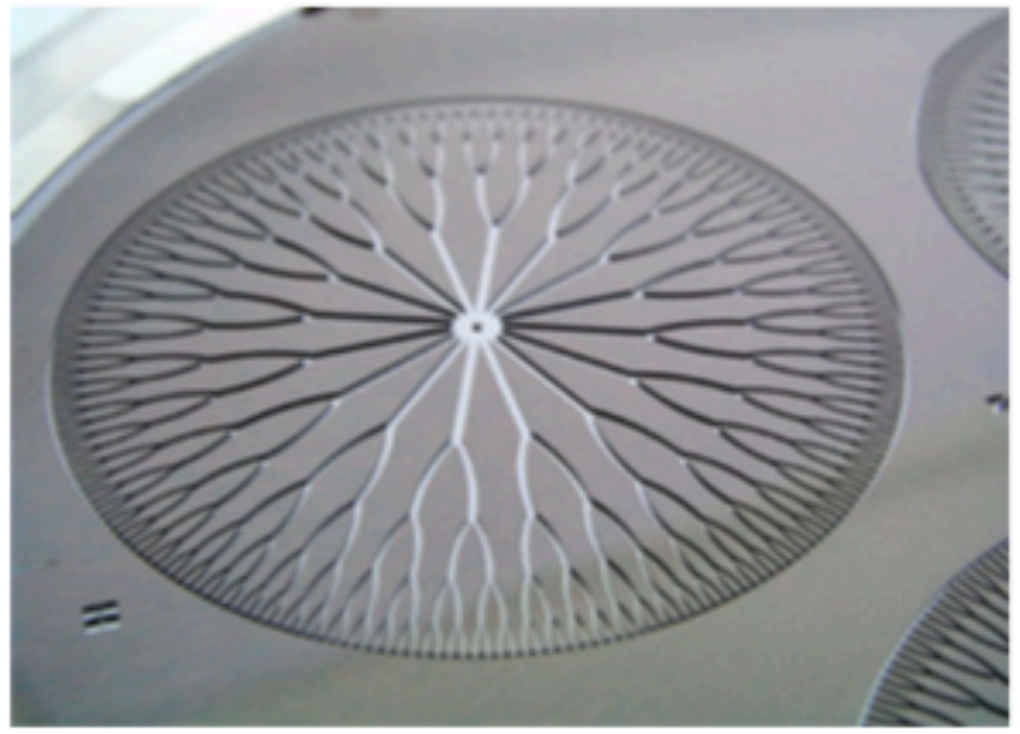
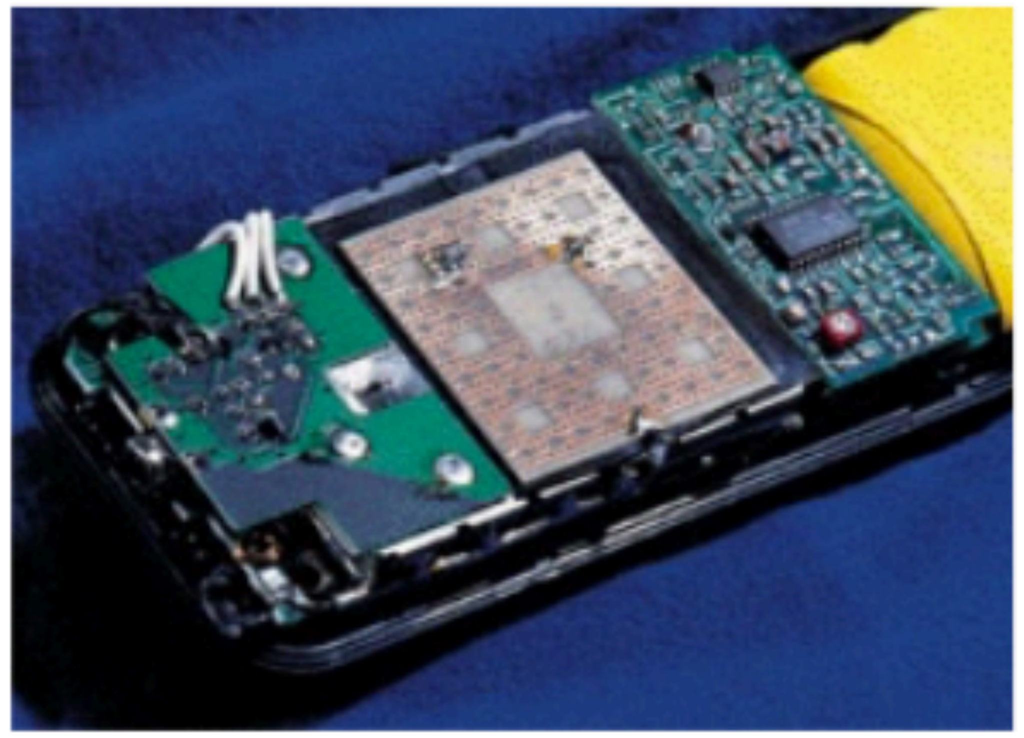




Image Sources: Fractal Foundation

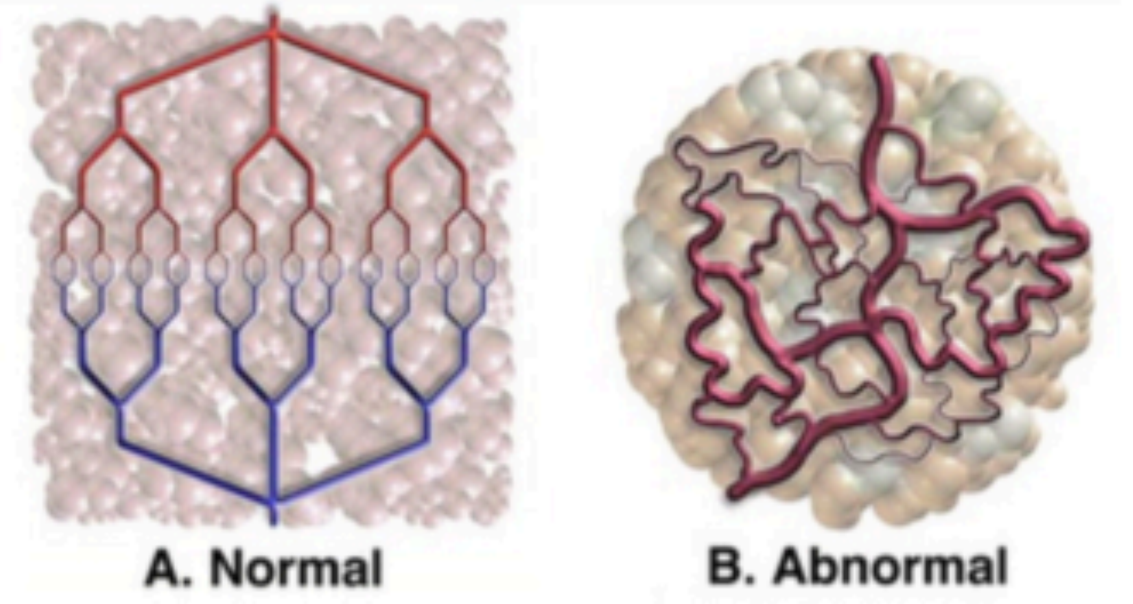
Fractals Applied



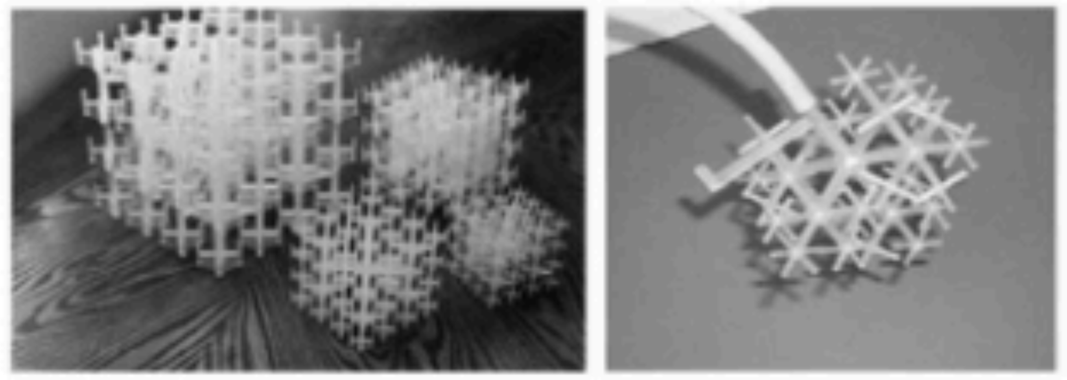
A computer chip cooling circuit etched in a fractal branching pattern. Developed by researchers at Oregon State University, the device channels liquid nitrogen across the surface to keep the chip cool.



Fractal antennas developed by Fractenna in the US and Fractus in Europe are making their way into cellphones and other devices. Because of their fractal shapes, these antennas can be very compact while receiving radio signals across a range of frequencies.

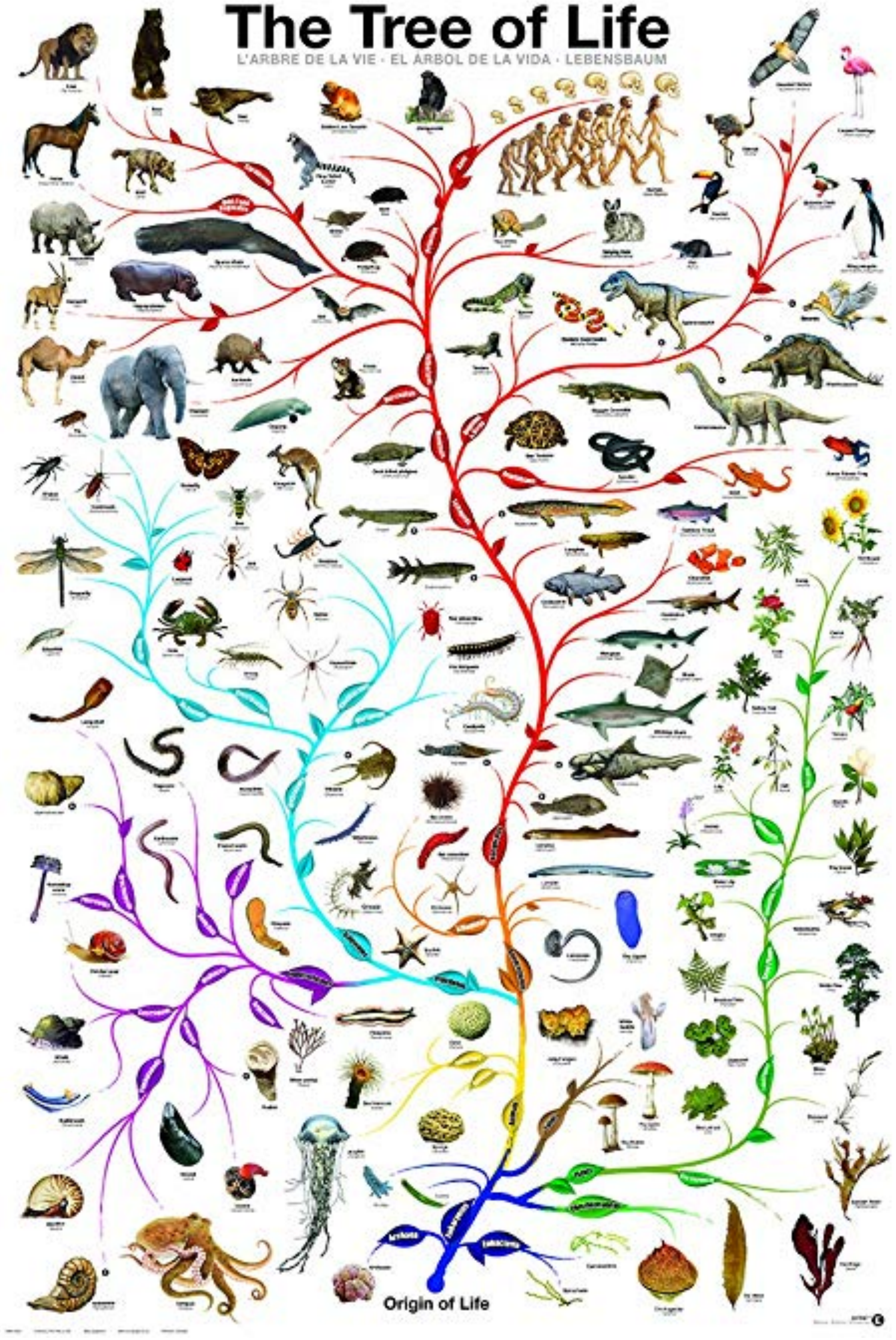


Researchers at Harvard Medical School and elsewhere are using fractal analysis to assess the health of blood vessels in cancerous tumors. Fractal analysis of CT scans can also quantify the health of lungs suffering from emphysema or other pulmonary illnesses.



Amalgamated Research Inc (ARI) creates space-filling fractal devices for high precision fluid mixing. Used in many industries, these devices allow fluids such as epoxy resins to be carefully and precisely blended without the need for turbulent stirring.

Image Sources: Fractal Foundation



Darwin’s Theory

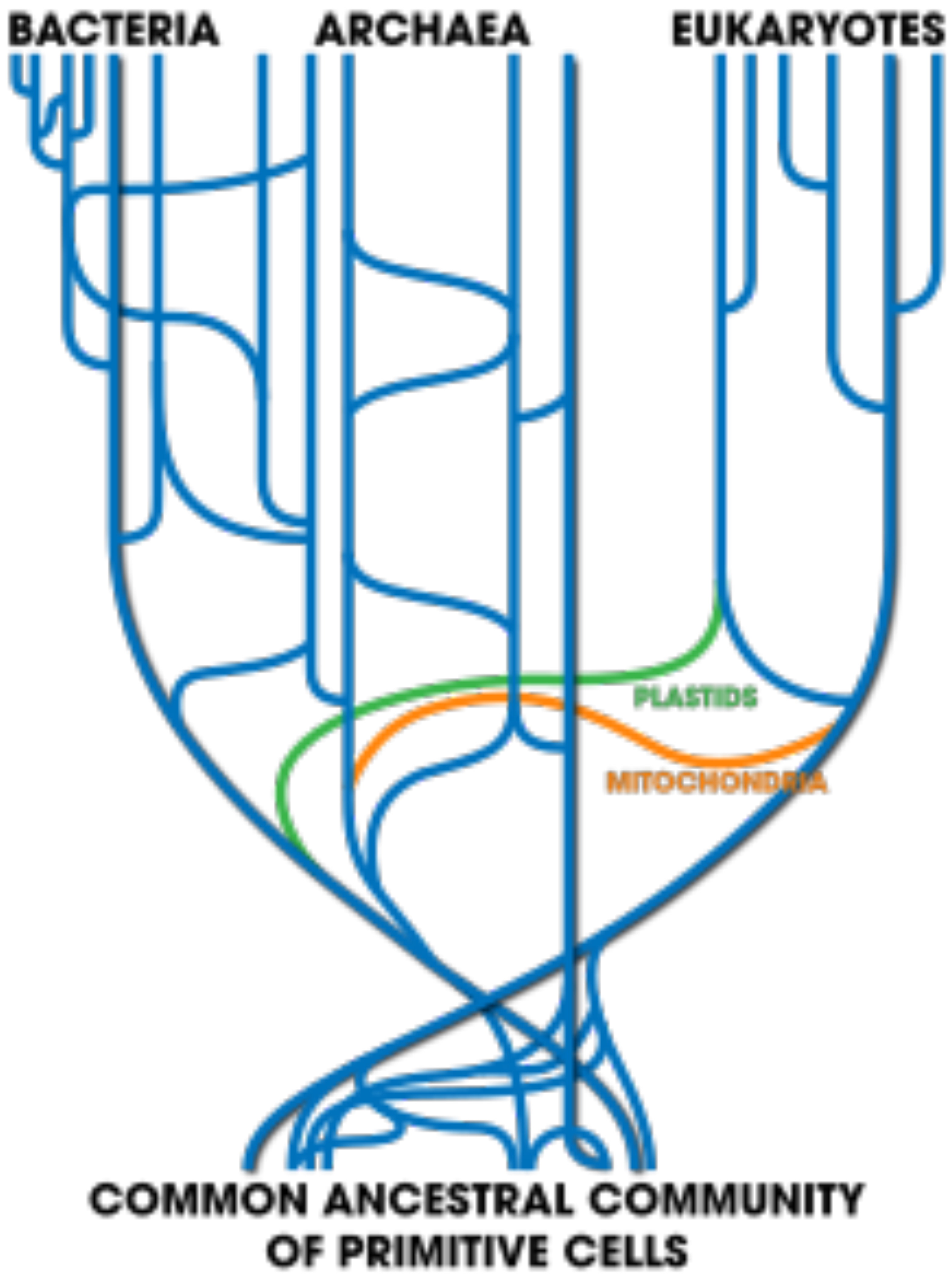
Evolution has occurred; that is, all species descend from a common ancestor. The history of life is **a branching tree of species**.

Natural selection occurs when the number of births is greater than existing resources can support so that **individuals undergo competition for resources**.

Traits of organisms are inherited with variation. **The variation is in some sense random**—that is, there is no force or bias leading to variations that increase fitness (though, as I mentioned previously, Darwin himself accepted Lamarck’s view that there are such forces).

Variation**s that turn out to be** adaptive in the current environment are likely to be selected, meaning that organisms with those variations are more likely to survive and thus pass on the new traits to their offspring, causing the number of organisms with those traits to increase over subsequent generations.

Evolutionary change is **constant and gradual via the accumulation of small, favorable variations**.



Modern Synthesis

Natural selection is the major mechanism of evolutionary change and adaptation.

Evolution is a gradual process, occurring via natural selection on very small random variations in individuals. Variation of this sort is highly abundant in populations and is not biased in any direction (e.g., it does not intrinsically lead to "improvement," as believed by Lamarck). The source of individual variation is random genetic mutations and recombinations.

Macroscale phenomena, such as the origin of new species, can be explained by the microscopic process of gene variation and natural selection.

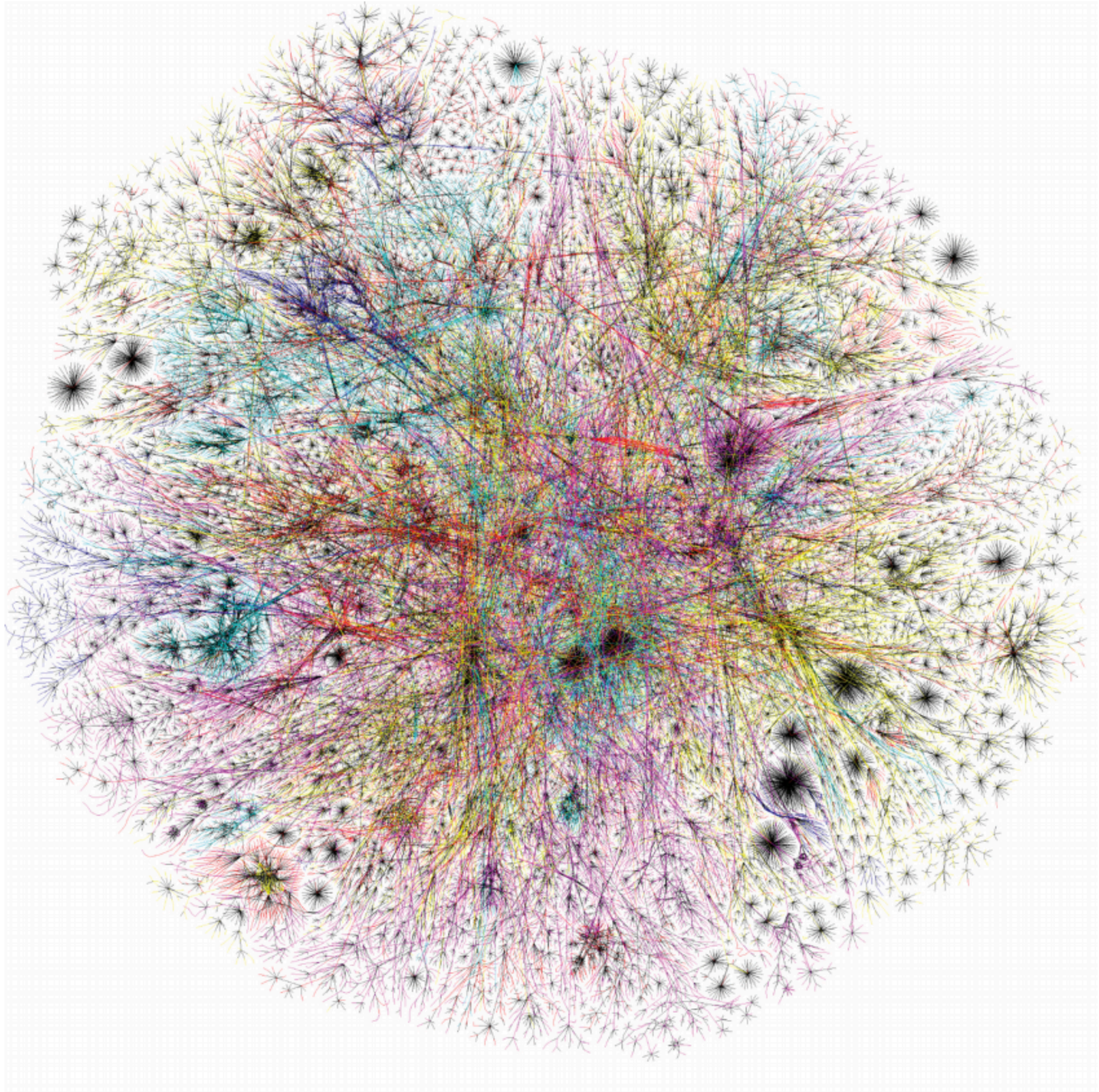


Figure 1.1: The network structure of the Internet. The nodes in this representation of the Internet are "class C subnets"—groups of computers with similar Internet addresses that are usually under the management of a single organization—and the connections between them represent the routes taken by Internet data packets as they hop between subnets. The geometric positions of the nodes in the picture have no special meaning; they are chosen simply to give a pleasing layout and are not related, for instance, to geographic position of the nodes. The structure of the Internet is discussed in detail in Section 2.1. Figure created by the Opte Project (`http://www.opte.org`). Reproduced with permission.

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External Faculty, Santa Fe Institute

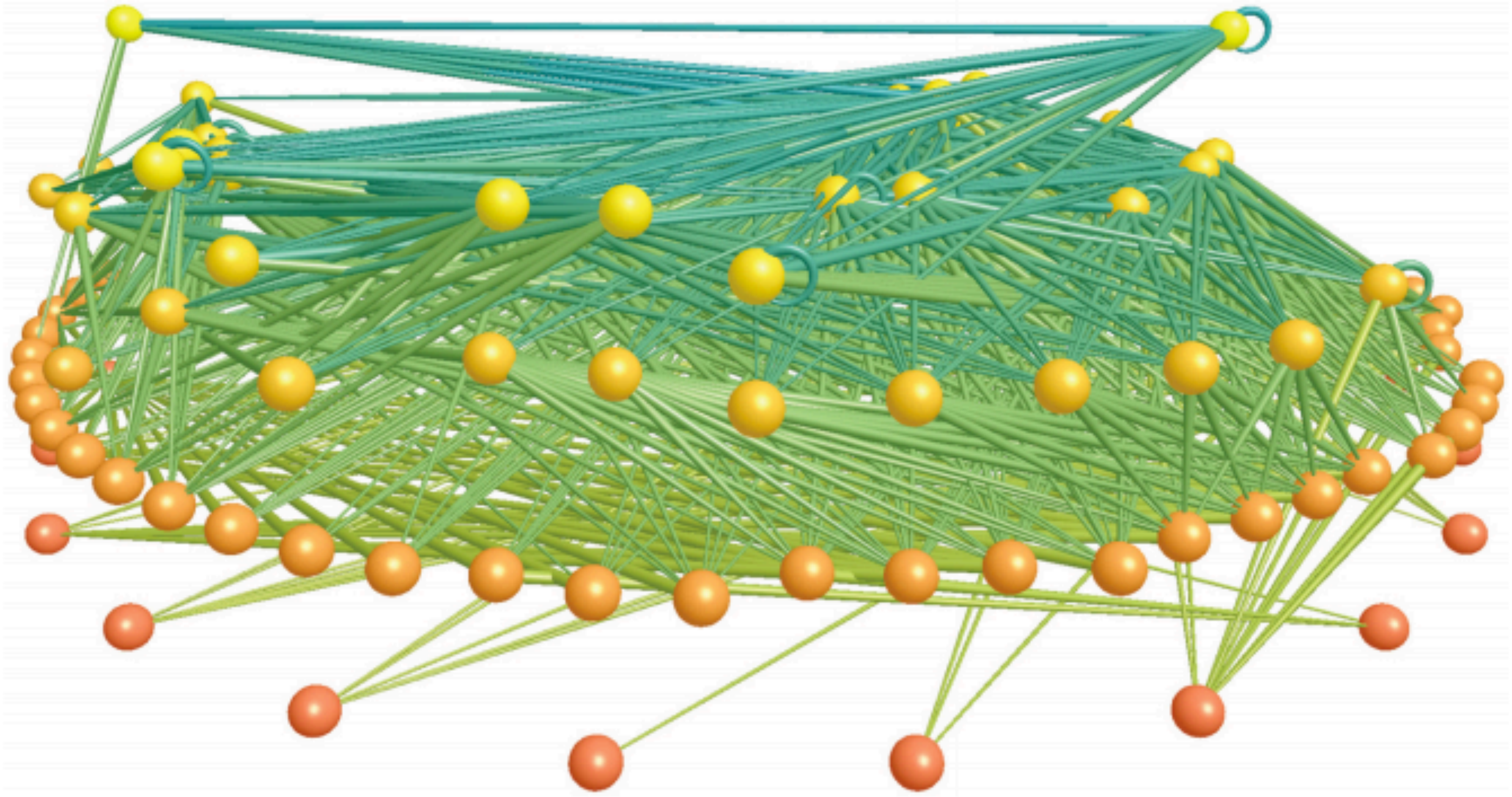

Figure 1.3: The food web of Little Rock Lake, Wisconsin. This elegant picture summarizes the known predatory interactions between species in a freshwater lake in the northern United States. The nodes represent the species and the edges run between predator–prey species pairs. The vertical position of the nodes represents, roughly speaking, the trophic level of the corresponding species. The figure was created by Richard Williams and Neo Martinez [321].

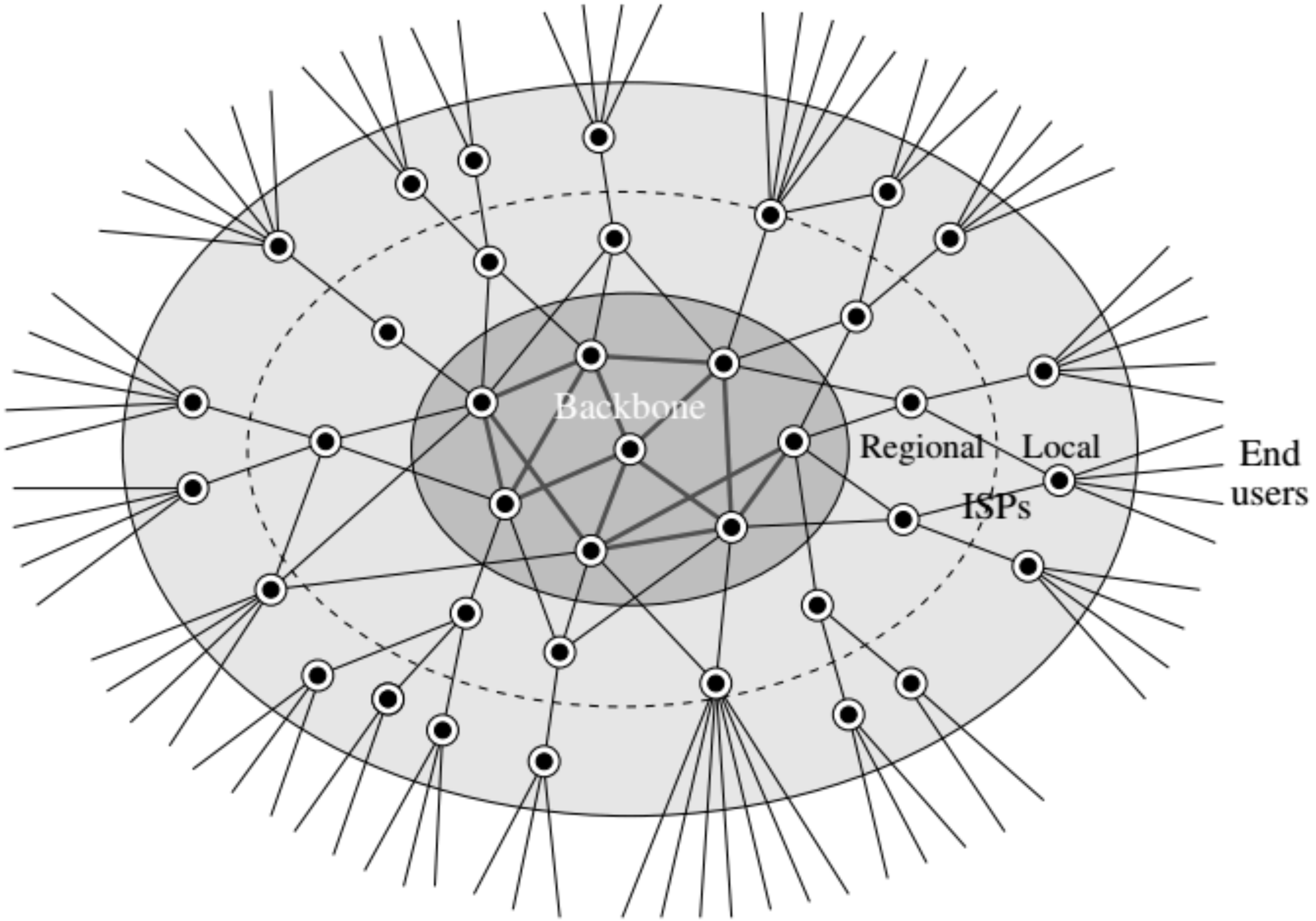

Figure 2.1: A schematic depiction of the structure of the Internet. The nodes and edges of the Internet fall into a number of different classes: the backbone of high-bandwidth long-distance connections; the ISPs, who connect to the backbone and who are divided roughly into regional (larger) and local (smaller) ISPs; and the end users—home users, companies, and so forth—who connect to the ISPs.

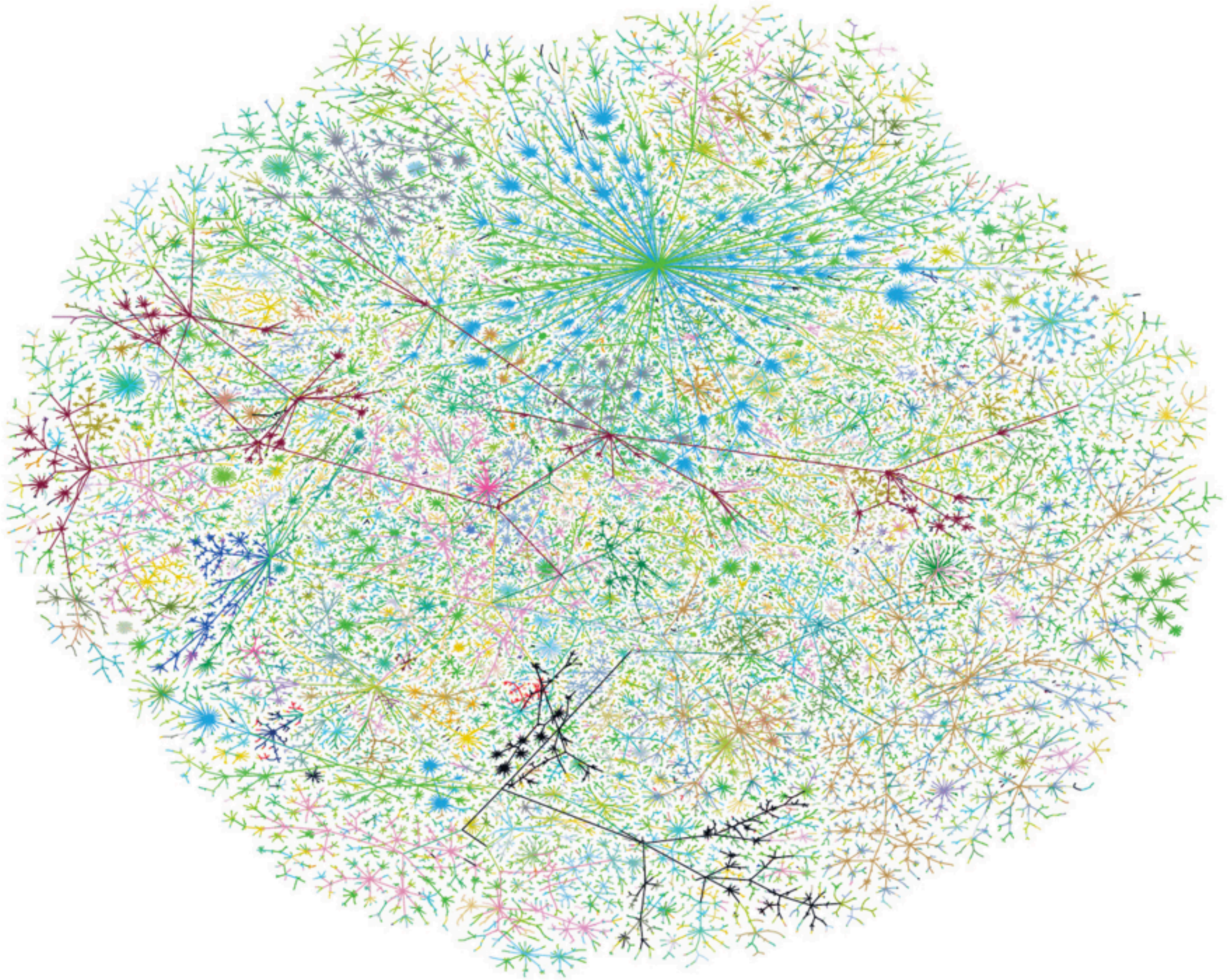

Figure 2.3: The structure of the Internet at the level of autonomous systems. The nodes in this network representation of the Internet are autonomous systems and the edges show the routes taken by data traveling between them. This figure is different from Fig. 1.1, which shows the network at the level of class C subnets. The picture was created by Hal Burch and Bill Cheswick. Patent(s) pending and Copyright Lumeta Corporation 2009. Reproduced with permission.

Complexity Theory & Circular Economy

How can we understand them?

How can we predict them?

How can we design them?

Why?

The majority of circular innovation tools provide a static view.

Not capturing the dynamic aspects of social and behavioral change.

D. Guzzo, D.C.A. Pigosso, N. Videira, J. Mascarenhas, A system dynamics-based framework for examining Circular Economy transitions, Journal of Cleaner Production,

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Linear vs. What if?

D. Guzzo, D.C.A. Pigosso, N. Videira, J. Mascarenhas, A system dynamics-based framework for examining Circular Economy transitions, Journal of Cleaner Production,

Agent-based Modeling

Roman	*Hindu- Arabic*
I	1
V	5
X	10
L	50
C	100
D	500

Roman	Hindu- Arabic
I	1
V	5
X	10
L	50
C	100
D	500

By structuration we mean the encoding of the knowledge in a domain as a function of the representational infrastructure used to express the knowledge.

A change from one structuration of a domain to another resulting from such a change in representational infrastructure we call a restructuration.

An agent is an autonomous computational individual or object with particular properties and actions.

ABM is a form of computational modeling whereby a phenomenon is modeled in terms of agents and their interactions.

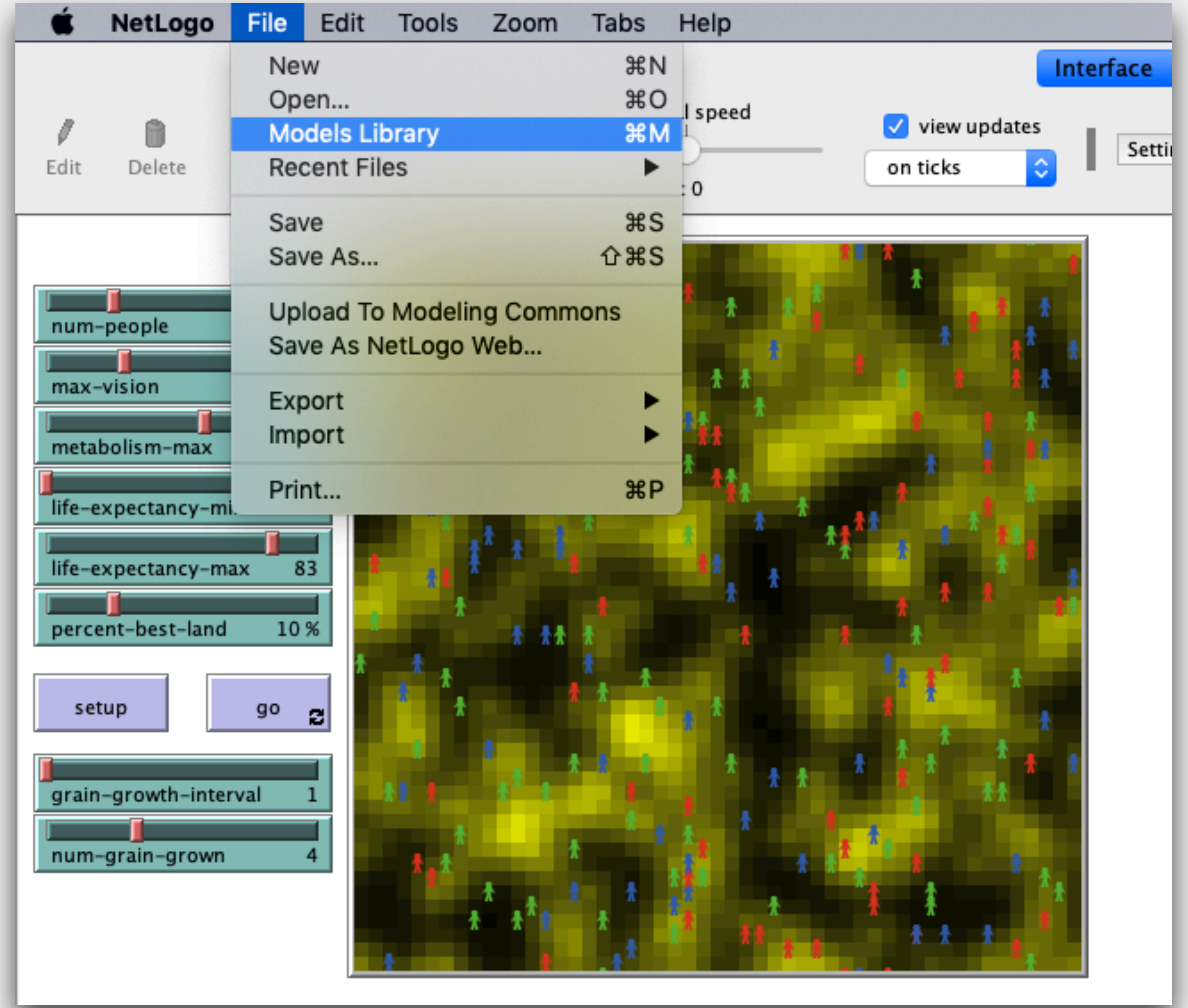
DETERMINISTIC-CENTRALIZED MINDSET

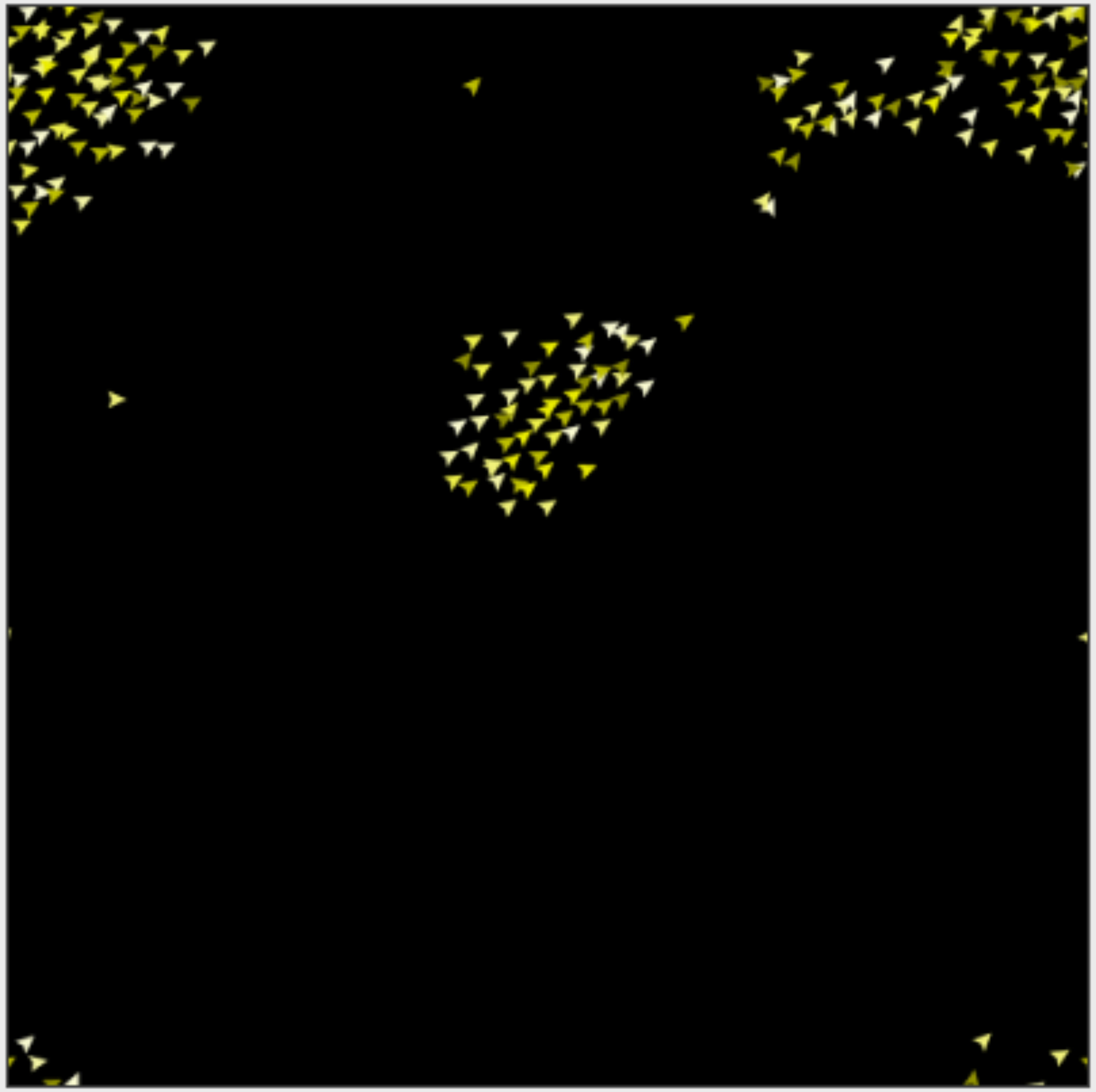
The pattern stemmed from two main empirical findings:

Most subjects did not see any role for randomness in creating these structures.

Randomness was seen as destructive to the pattern, not a force for creating a pattern

Most subjects described these patterns as arising from the actions of a centralized controller or orchestrator





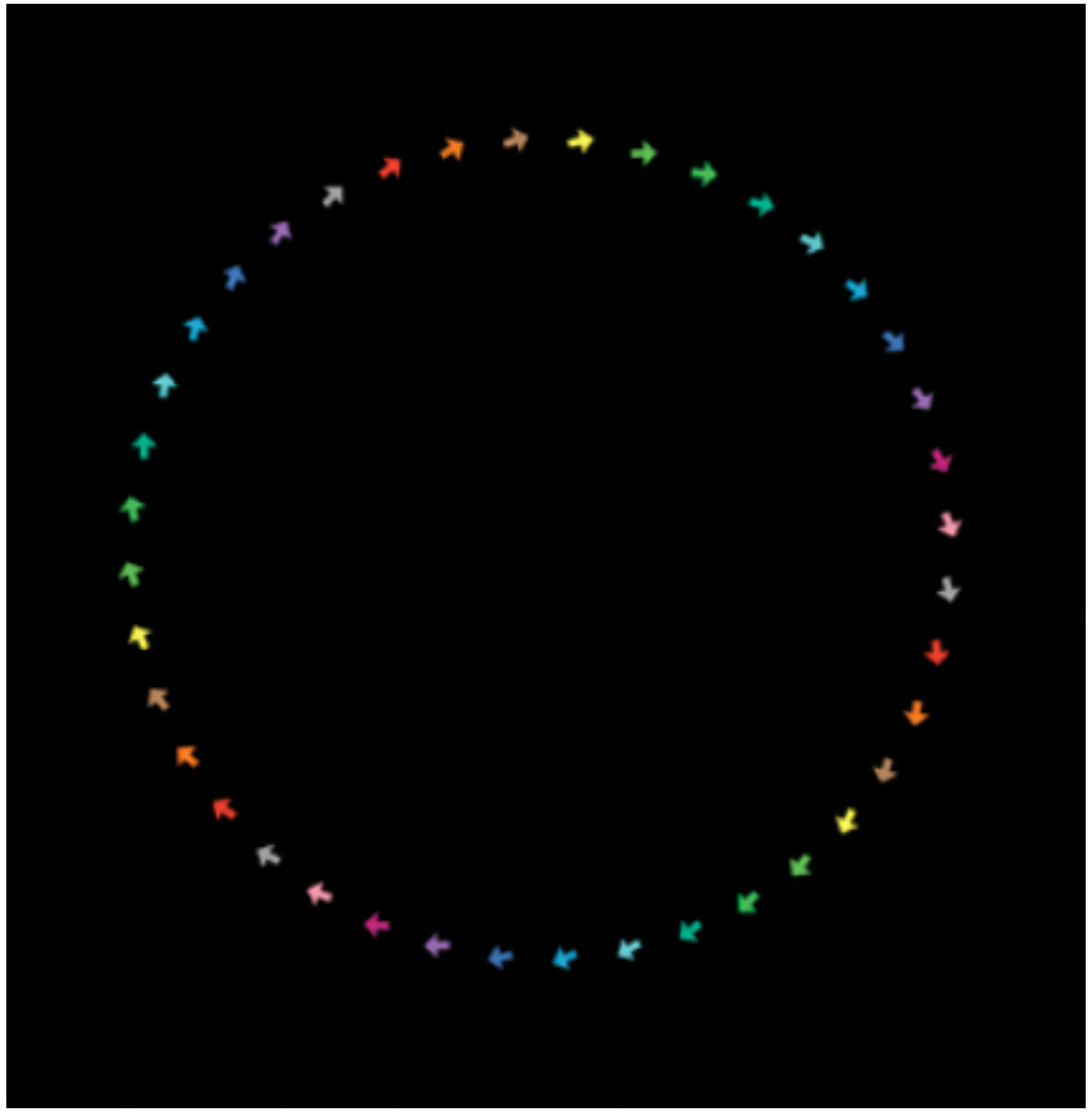
Flocking

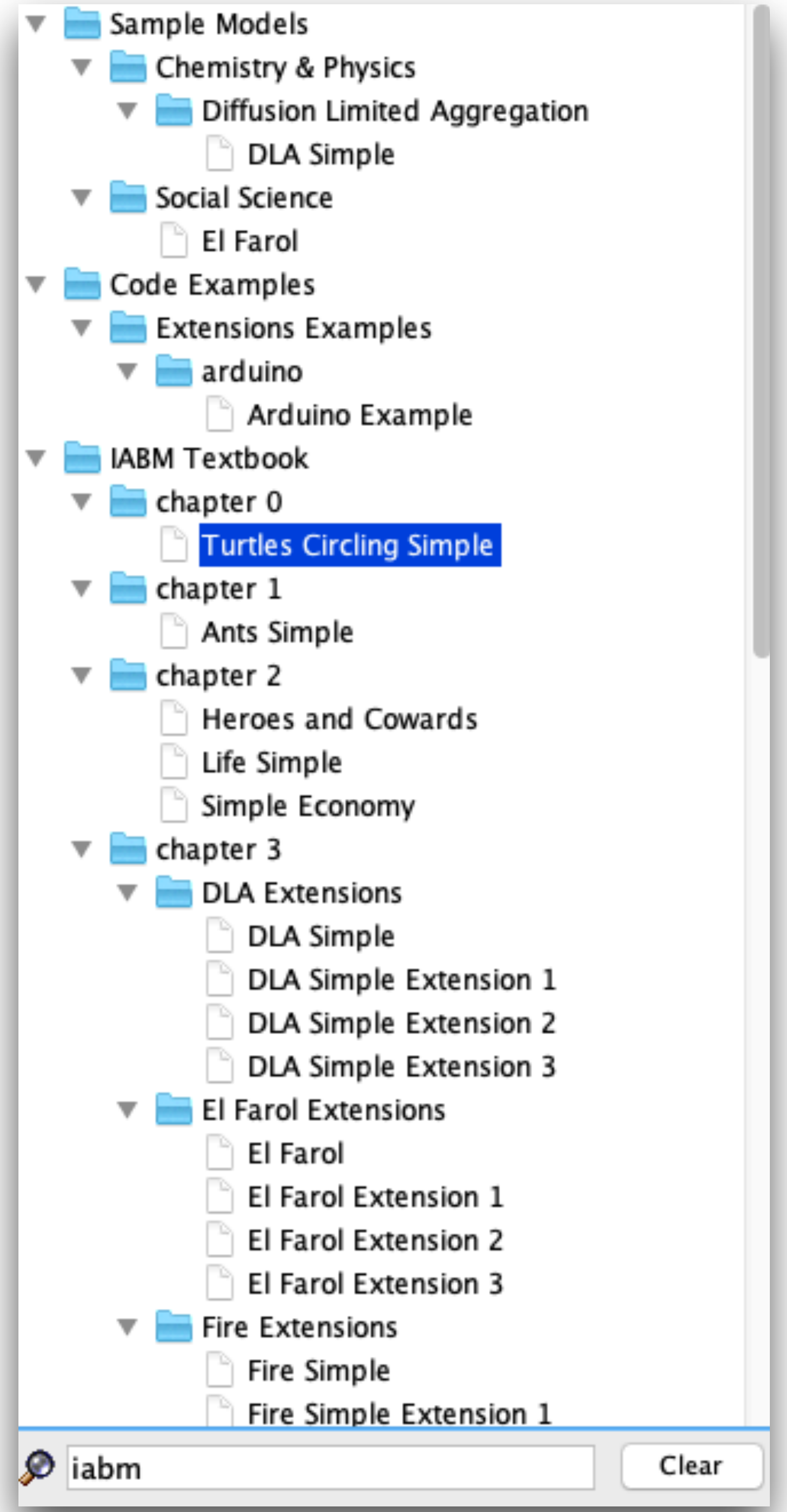
This model is an attempt to mimic the flocking of birds. (The resulting motion also resembles schools of fish.) The flocks that appear in this model are not created or led in any way by special leader birds. Rather, each bird is following exactly the same set of rules, from which flocks emerge.

Complex systems as systems that are composed of multiple individual elements that interact with each other yet whose aggregate properties or behavior is not predictable from the elements themselves.

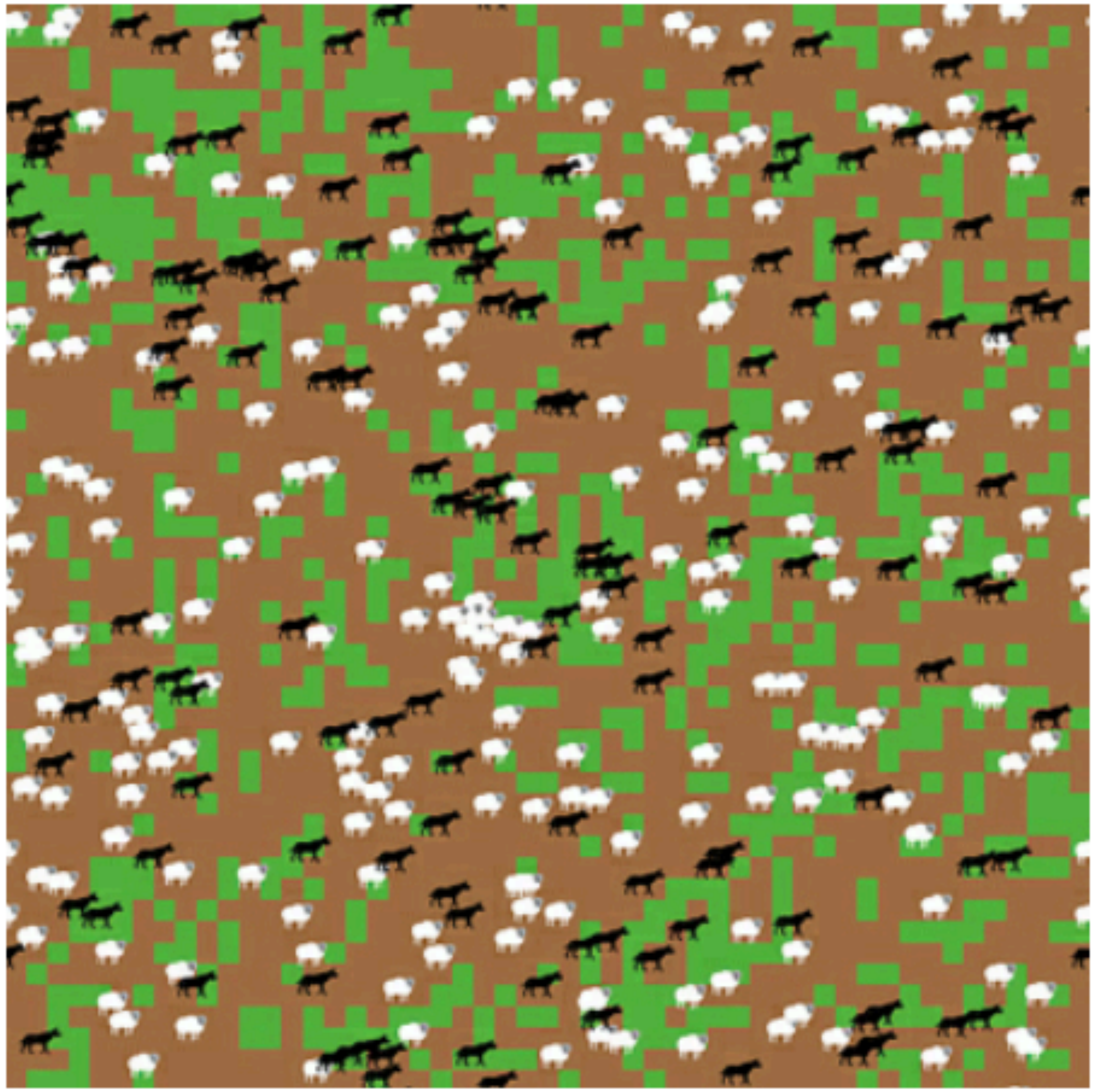
Through the interaction of the multiple distributed elements an “emergent phenomenon” arises.

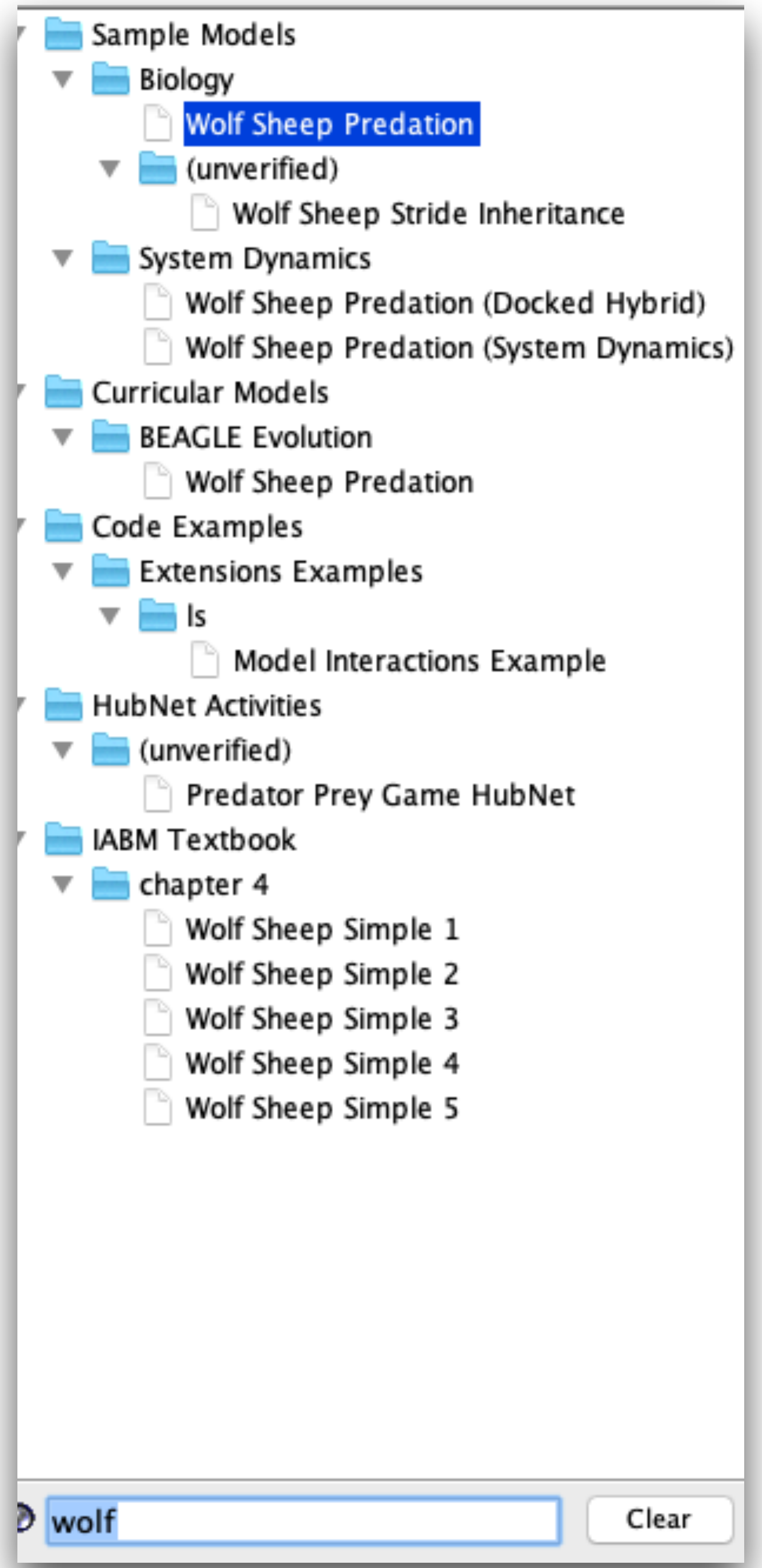
Emergence as the arising of novel and coherent structures, patterns, and properties through the interactions of multiple distributed elements.

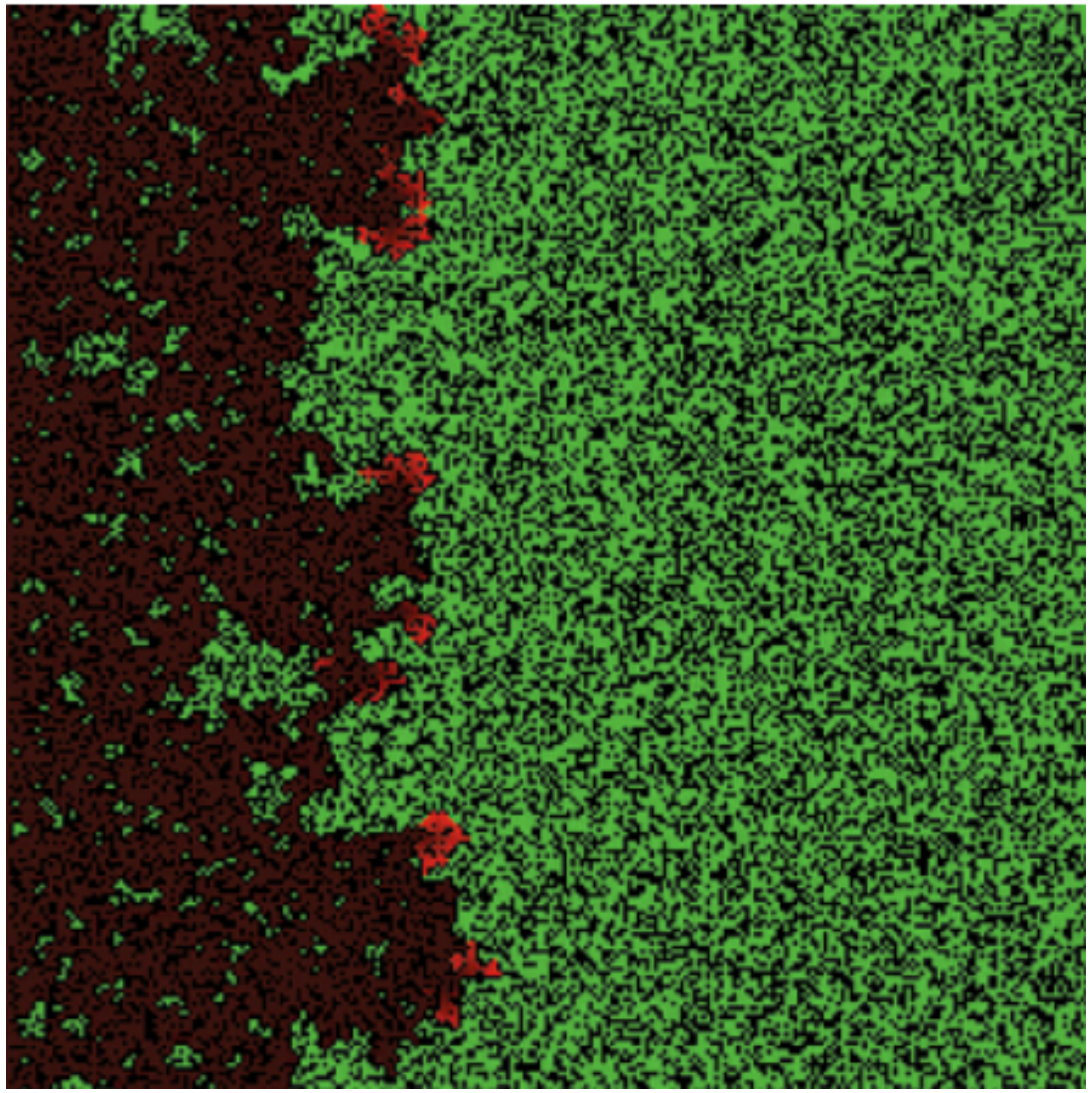


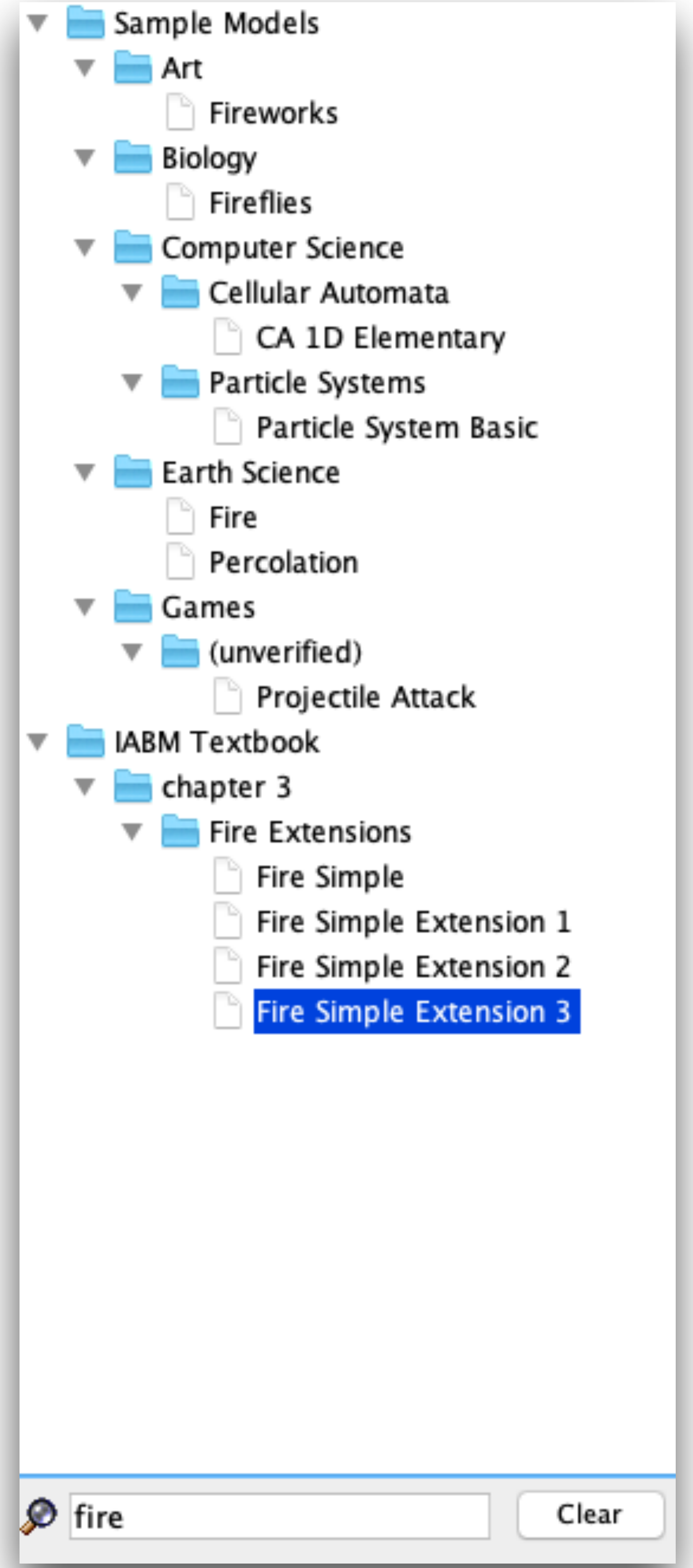

Sample Models
Chemistry & Physics
Diffusion Limited Aggregation
DLA Simple
Social Science
El Farol
Code Examples
Extensions Examples
arduino
Arduino Example
IABM Textbook
chapter 0
Turtles Circling Simple
chapter 1
Ants Simple
chapter 2
Heroes and Cowards
Life Simple
Simple Economy
chapter 3
DLA Extensions
DLA Simple
DLA Simple Extension 1
DLA Simple Extension 2
DLA Simple Extension 3
El Farol Extensions
El Farol
El Farol Extension 1
El Farol Extension 2
El Farol Extension 3
Fire Extensions
Fire Simple
Fire Simple Extension 1
iabm
Clear

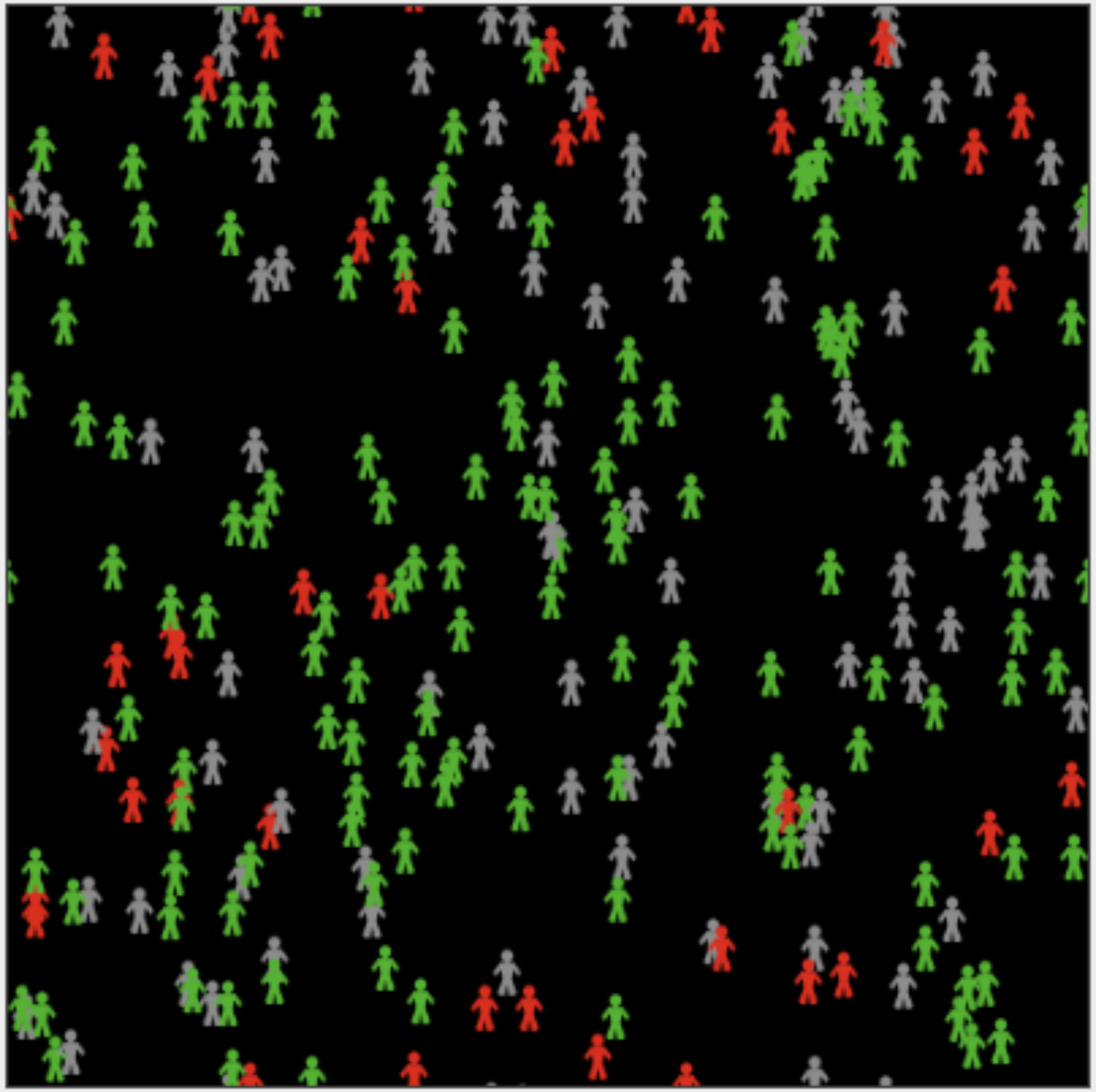
The goal of agent-based modeling is to create agents and rules that will generate a target behavior.




Sample Models
Biology
Wolf Sheep Predation
(unverified)
Wolf Sheep Stride Inheritance
System Dynamics
Wolf Sheep Predation (Docked Hybrid)
Wolf Sheep Predation (System Dynamics)
Curricular Models
BEAGLE Evolution
Wolf Sheep Predation
Code Examples
Extensions Examples
ls
Model Interactions Example
HubNet Activities
(unverified)
Predator Prey Game HubNet
IABM Textbook
chapter 4
Wolf Sheep Simple 1
Wolf Sheep Simple 2
Wolf Sheep Simple 3
Wolf Sheep Simple 4
Wolf Sheep Simple 5
wolf
Clear

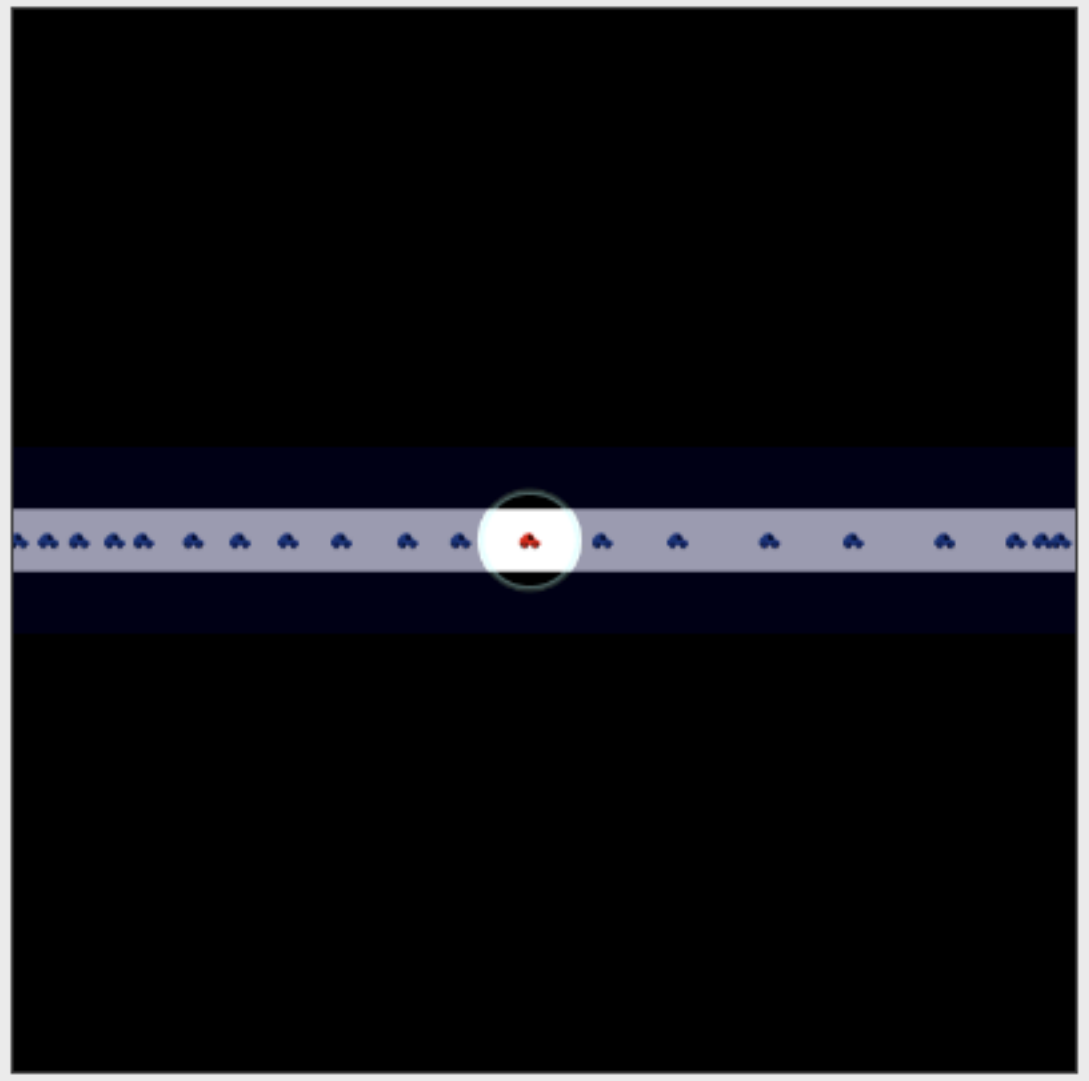



Sample Models
Art
Fireworks
Biology
Fireflies
Computer Science
Cellular Automata
CA 1D Elementary
Particle Systems
Particle System Basic
Earth Science
Fire
Percolation
Games
(unverified)
Projectile Attack
IABM Textbook
chapter 3
Fire Extensions
Fire Simple
Fire Simple Extension 1
Fire Simple Extension 2
Fire Simple Extension 3
fire
Clear



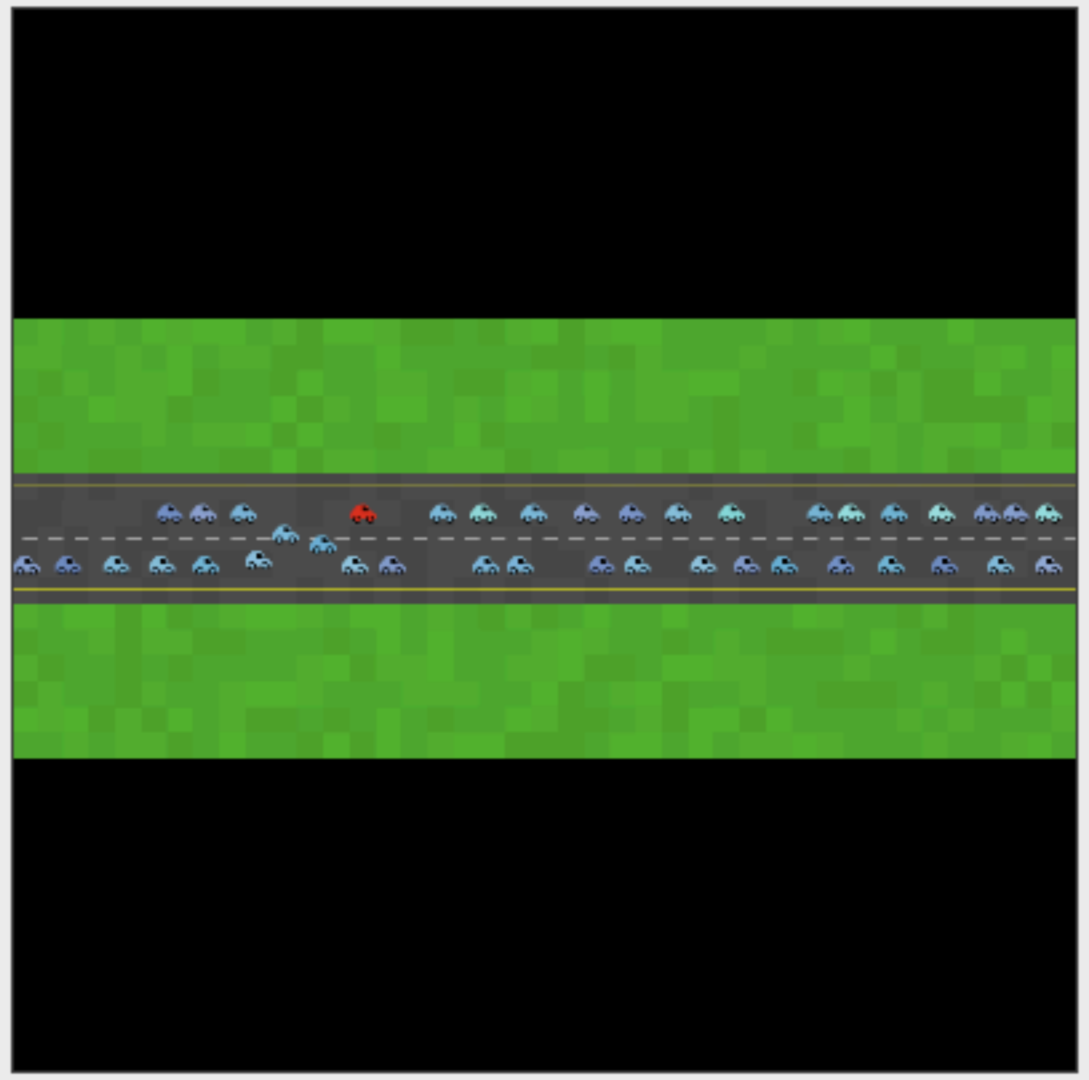
Virus

This model simulates the transmission and perpetuation of a virus in a human population.



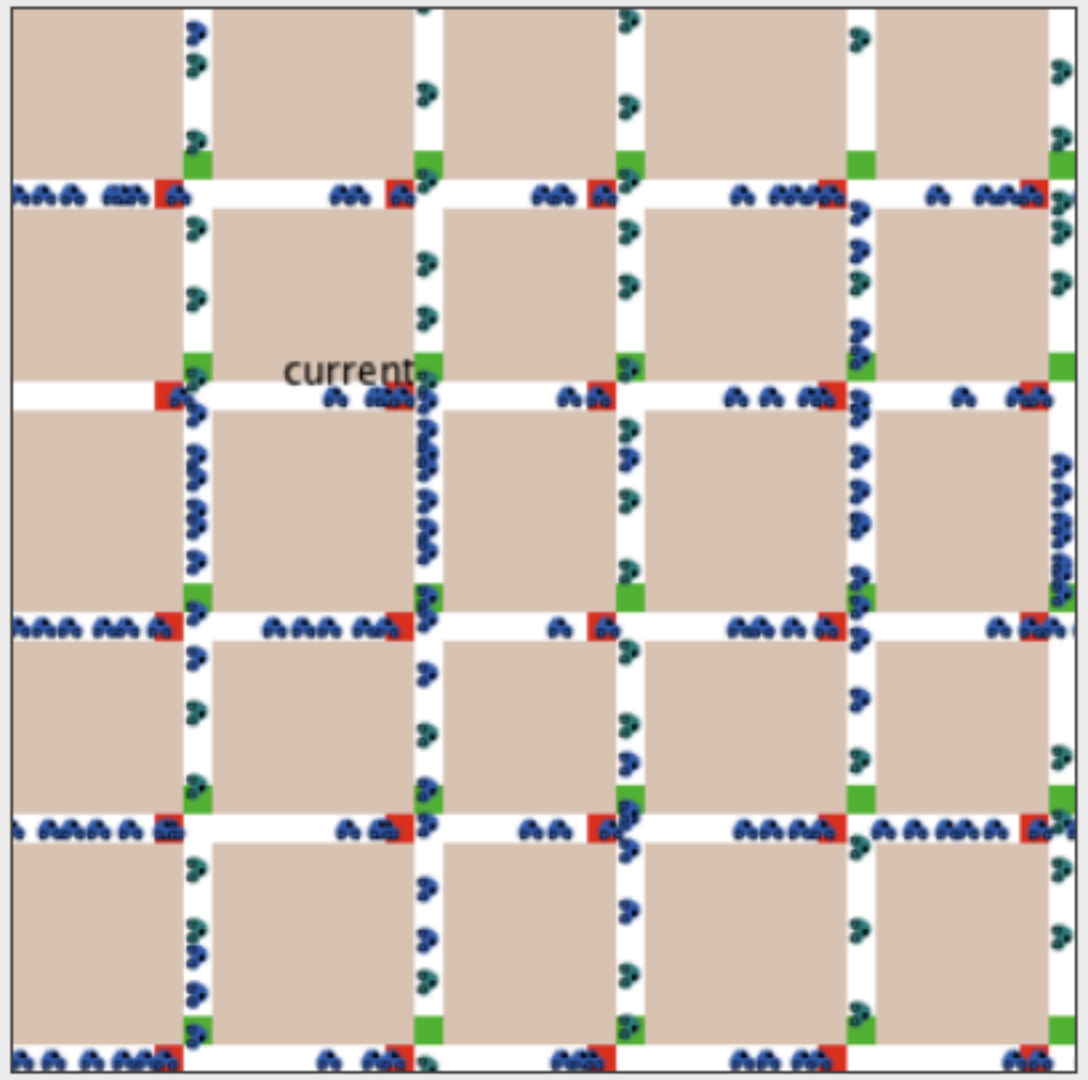
Traffic Basic

This model models the movement of cars on a highway. Each car follows a simple set of rules: it slows down (decelerates) if it sees a car close ahead, and speeds up (accelerates) if it doesn't see a car ahead. The model demonstrates how traffic jams can form even without any accidents, broken bridges, or overturned trucks. No "centralized cause" is needed for a traffic jam to form.



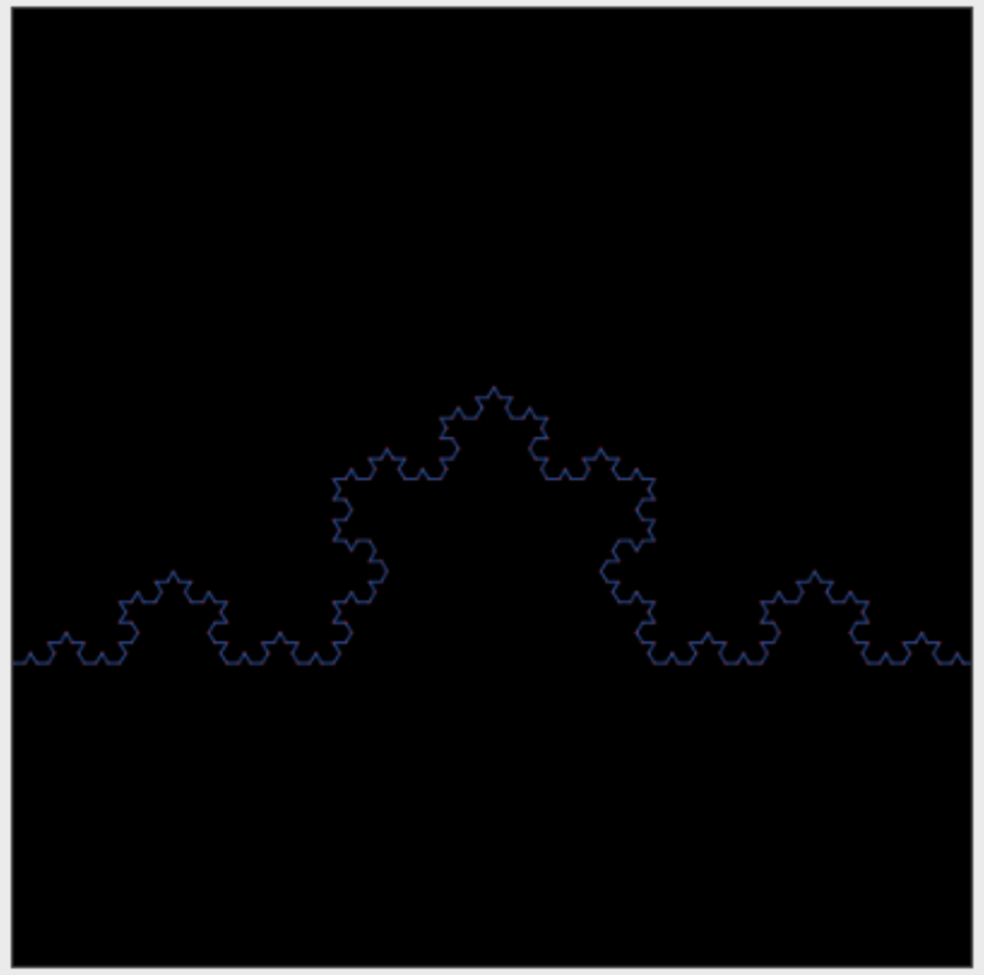
Traffic 2 Lanes

This model is a more sophisticated two-lane version of the "Traffic Basic" model. Much like the simpler model, this model demonstrates how traffic jams can form. In the two-lane version, drivers have a new option; they can react by changing lanes, although this often does little to solve their problem.



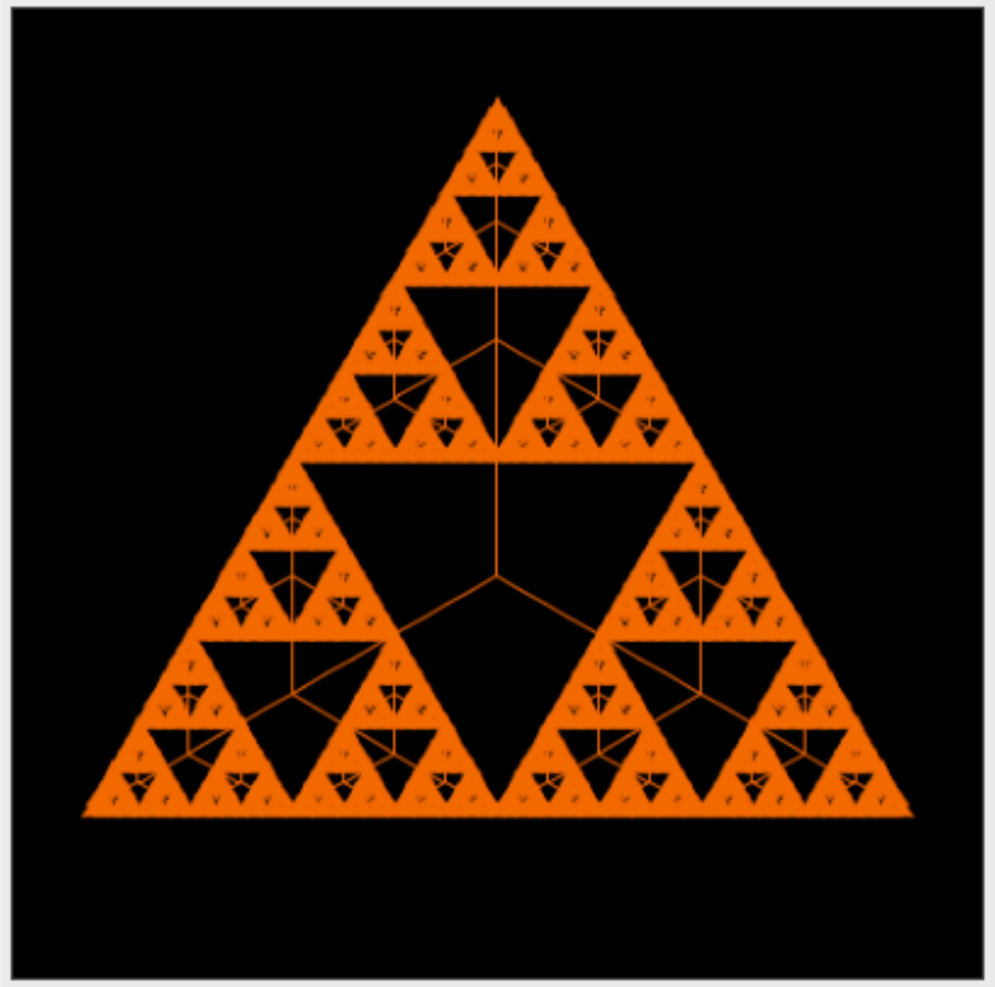
Traffic Grid

This is a model of traffic moving in a city grid. It allows you to control traffic lights and global variables, such as the speed limit and the number of cars, and explore traffic dynamics.



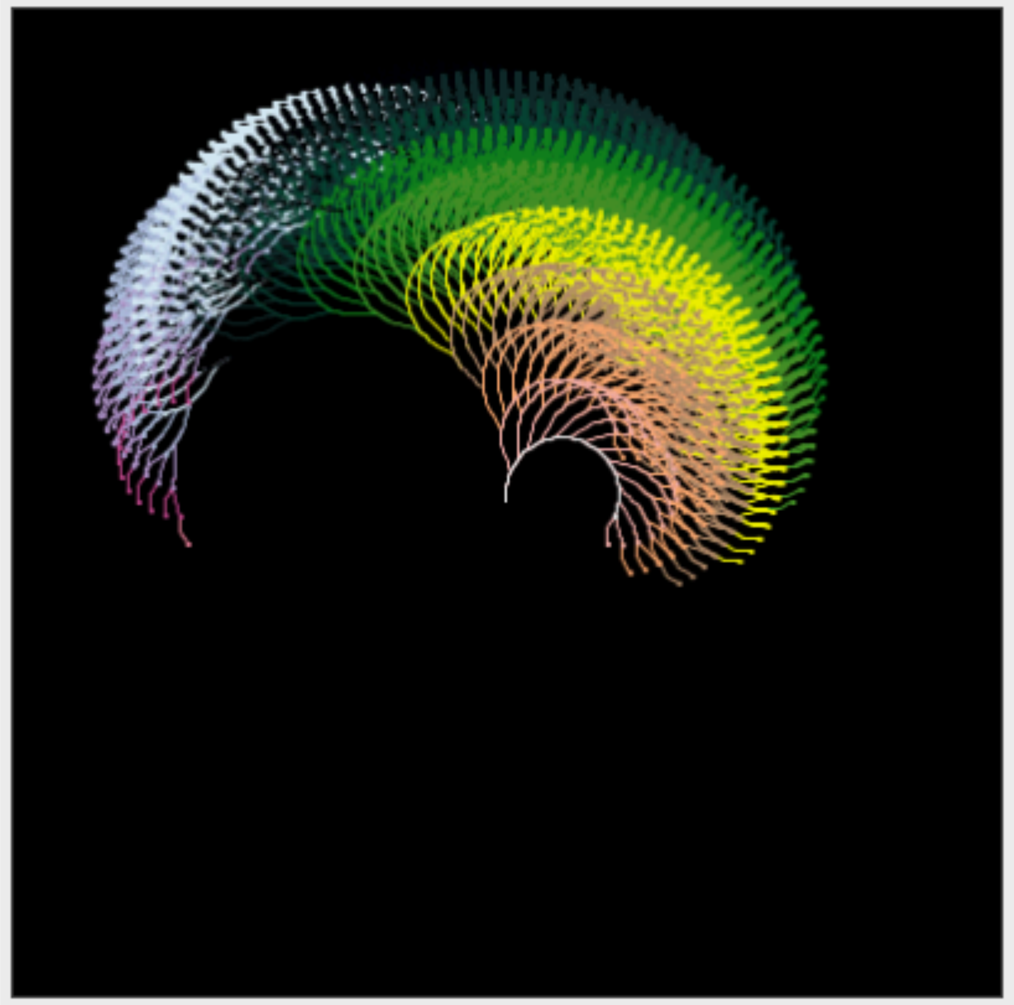
Koch Curve

Helge von Koch was a Swedish mathematician who, in 1904, introduced what is now called the Koch curve. This curve contains no straight lines which are smooth in the sense that we could see them as a carefully bent line. Rather this curve has much of the complexity which we could see in a natural coastline: folds within folds within folds and so on.



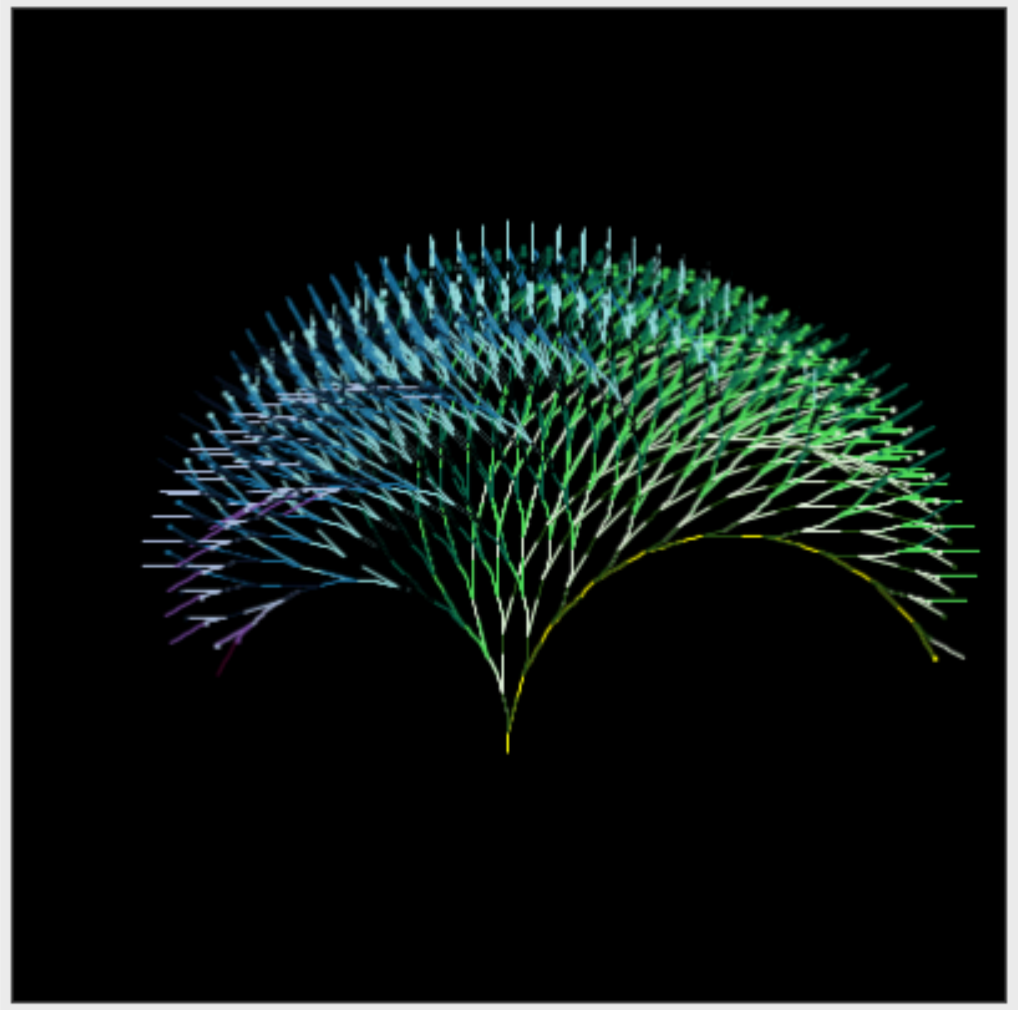
Sierpinski Simple

The fractal that this model produces was discovered by the great Polish mathematician Waclaw Sierpinski in 1916. Sierpinski was a professor at Lvov and Warsaw. He was one of the most influential mathematicians of his time in Poland and had a worldwide reputation. One of the moon's craters is named after him.



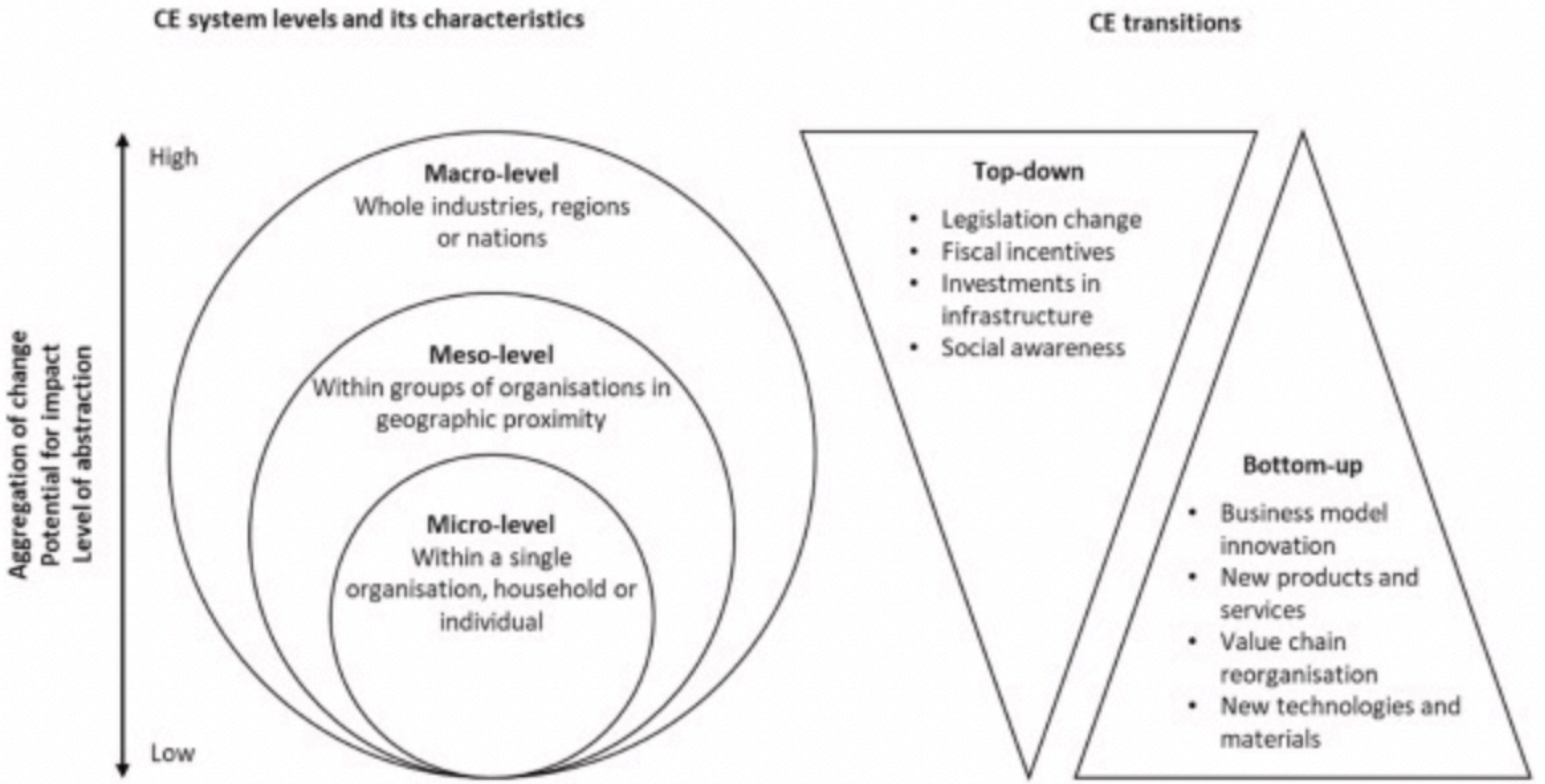
L-System Fractals

This program draws special types of pictures called fractals. A fractal is a shape that is self-similar — that is, it looks the same no matter how closely you zoom in or out For instance, a tree can be thought of as a fractal since if you look at the tree as a whole, you see a stick, that is to say the trunk, with branches coming out of it. Then if you look at a smaller portion of it, say a branch, you see a similar thing, namely, a stick with branches coming out of it.

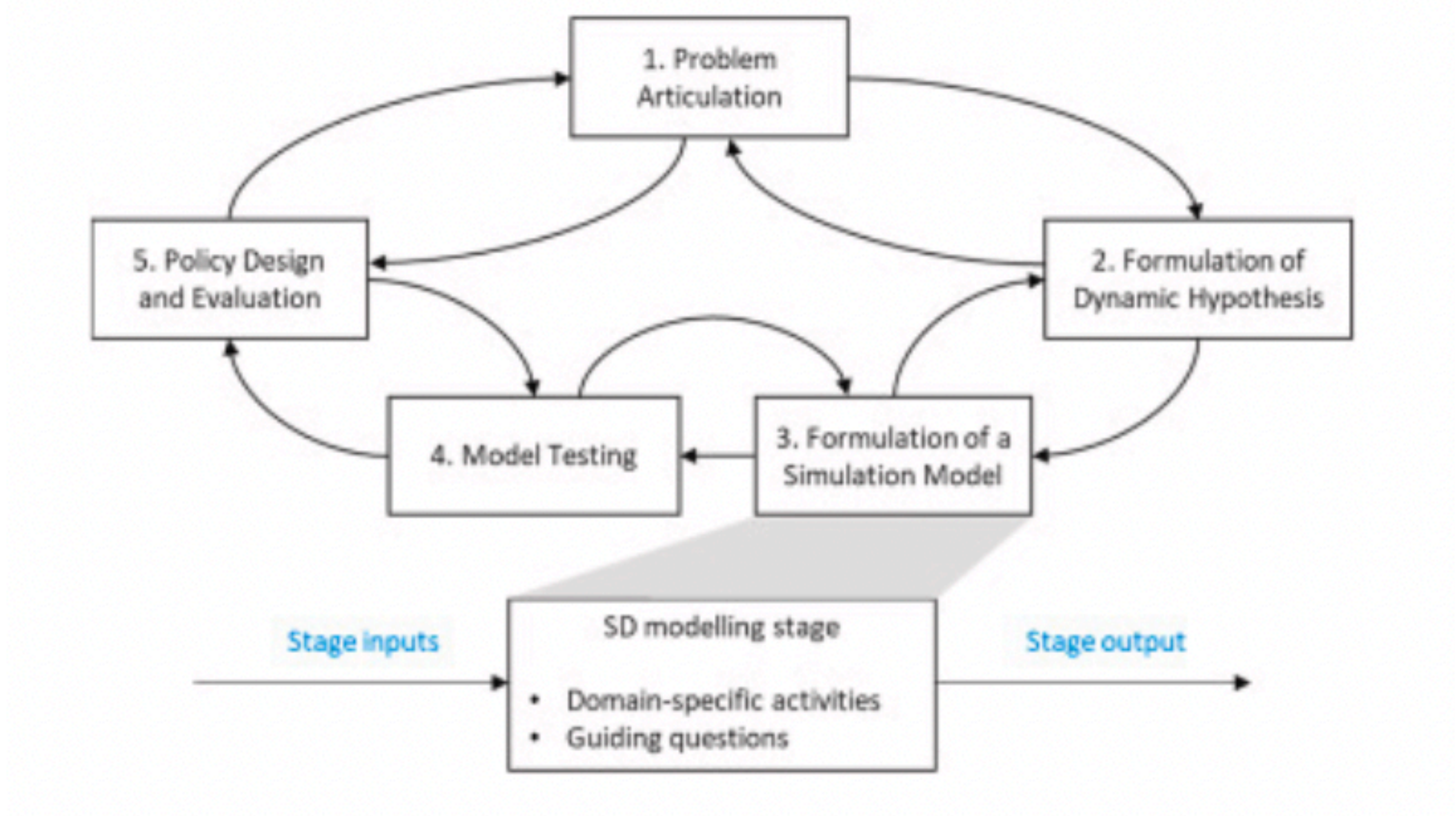


Tree Simple

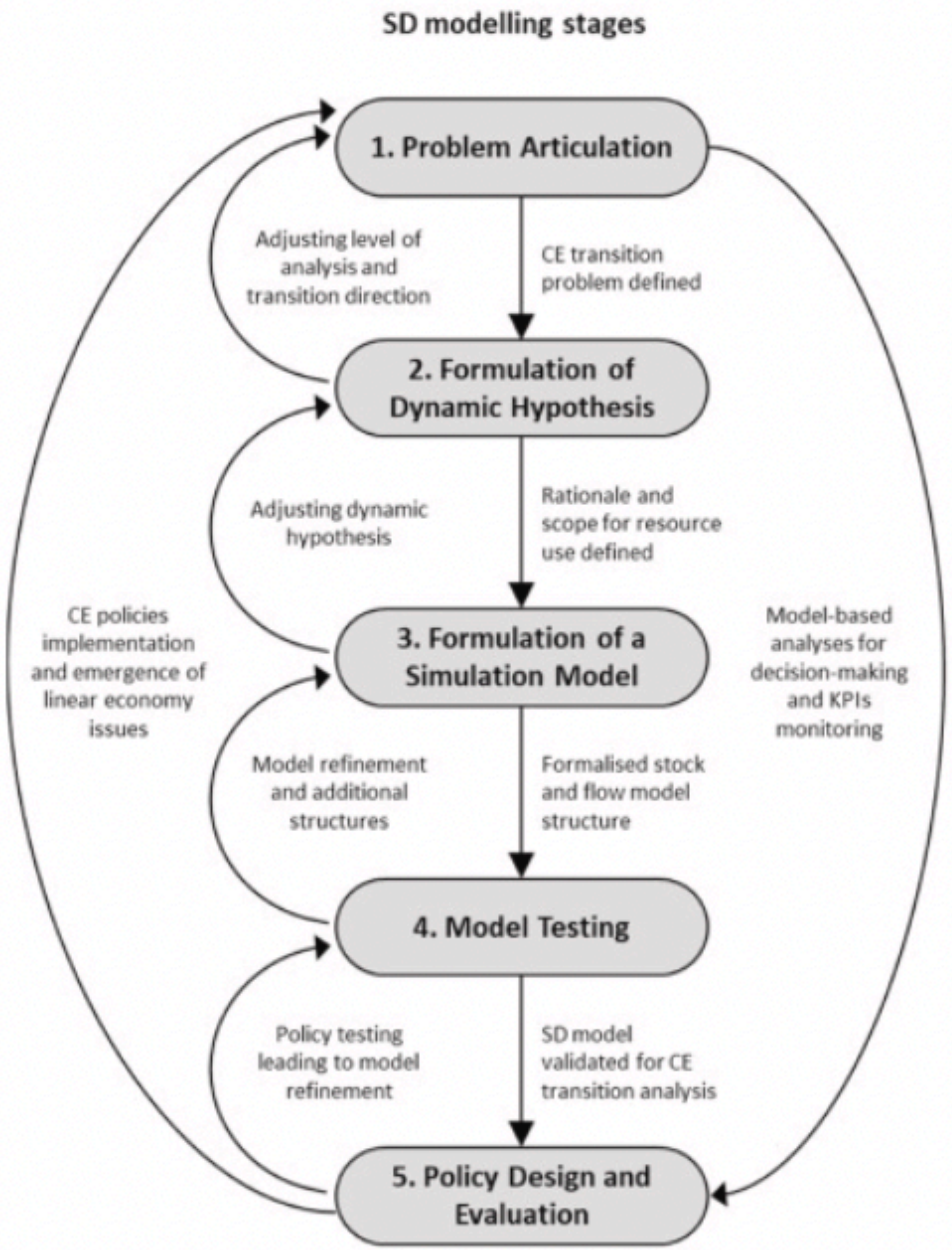
This program draws special types of pictures called fractals. A fractal is a shape that is self-similar - that is, it looks the same no matter how closely you zoom in or out. For instance, a tree can be thought of as a fractal since if you look at the tree as a whole, you see a stick, that is to say the trunk, with branches coming out of it. Then if you look at a smaller portion of it, say a branch, you see a similar thing, namely, a stick with branches coming out of it.



D. Guzzo, D.C.A. Pigosso, N. Videira, J. Mascarenhas, A system dynamics-based framework for examining Circular Economy transitions, Journal of Cleaner Production,



D. Guzzo, D.C.A. Pigosso, N. Videira, J. Mascarenhas, A system dynamics-based framework for examining Circular Economy transitions, Journal of Cleaner Production,



Activities	Guiding questions
A1.1. Define CE system level of analysis **A1.2.** Determine transition direction: top-down, bottom-up, combination, conceptual **A1.3.** Define industry of interest **A1.4.** Consider primary and secondary sources for investigation	**Q1.1.** How can the modelling effort contribute to a CE transition in that system? **Q1.2.** Are the CE system level of analysis, the transition direction and the industry clearly stated in the modelling purpose? **Q1.3.** Is the research protocol adequate to investigate a shift in that system?
A2.1. Define rationale for resources use **A2.2.** Connect to existing methodologies **A2.3.** Set model boundaries	**Q2.1.** Are the logics for product demand, resource usage, and circularity comprehensively understood for the system under investigation? Are the relevant life cycle stages considered? **Q2.2.** What are the model boundaries? What behaviour is endogenous, exogenous, and excluded? Is the scope adequate to holistically understand the flow of resources?
A3.1. Define the time scale **A3.2.** Apply structures available: in the Circular EEE SD Model and in the SD literature **A3.3.** Engage with the SD community	**Q3.1.** Is the time scale adequate to investigate that CE transition? Is there available data and evidence to sustain assumptions for the selected time horizon? Is it enough to show patterns of behaviour? **Q3.2.** Which are stock and flow structures capable of operationalising the logics of the resources' flows? Could you adapt available SD models and structures? **Q3.3.** Are you taking advantage of (and contributing to) the communities of practice? What modelling skills and features you still need to master?
A4.1. Iterative modelling and testing **A4.2.** Build a testing control panel **A4.3.** Set reference modes to business-as-usual scenarios **A4.4.** Ensure contextual, structure and behavioural validity	**Q4.1.** Can you define a reference mode to calibrate the model? Is it a reliable BAU, linear economy scenario? **Q4.2.** Can you ensure model fitness to purpose? Which were the contextual, structural, and behavioural validity tests performed? ○ What are the assumptions for boundaries, structures, and parameters? ○ Does the model structure conform to basic physical laws? ○ Does the simulated behaviour match available evidence and 'real-world' behaviour? **Q4.3.** Is the model widely available for verification by other modelers/users?
A5.1. Set-up decision-making scenarios **A5.2.** Determine circularity and sustainability KPIs	**Q.5.1.** What insights the defined CE transition scenarios provide? What are the circularity and sustainability KPIs? How does monitoring them facilitate decision-making?

D. Guzzo, D.C.A. Pigosso, N. Videira, J. Mascarenhas, A system dynamics-based framework for examining Circular Economy transitions, Journal of Cleaner Production,

Your turn

https://ccl.northwestern.edu/netlogo/

AGENDA

Complexity & Circularity + Play

Break

Speculative Practices + Play

AGENDA

Complexity & Circularity + Play

Break

Speculative Practices + Play

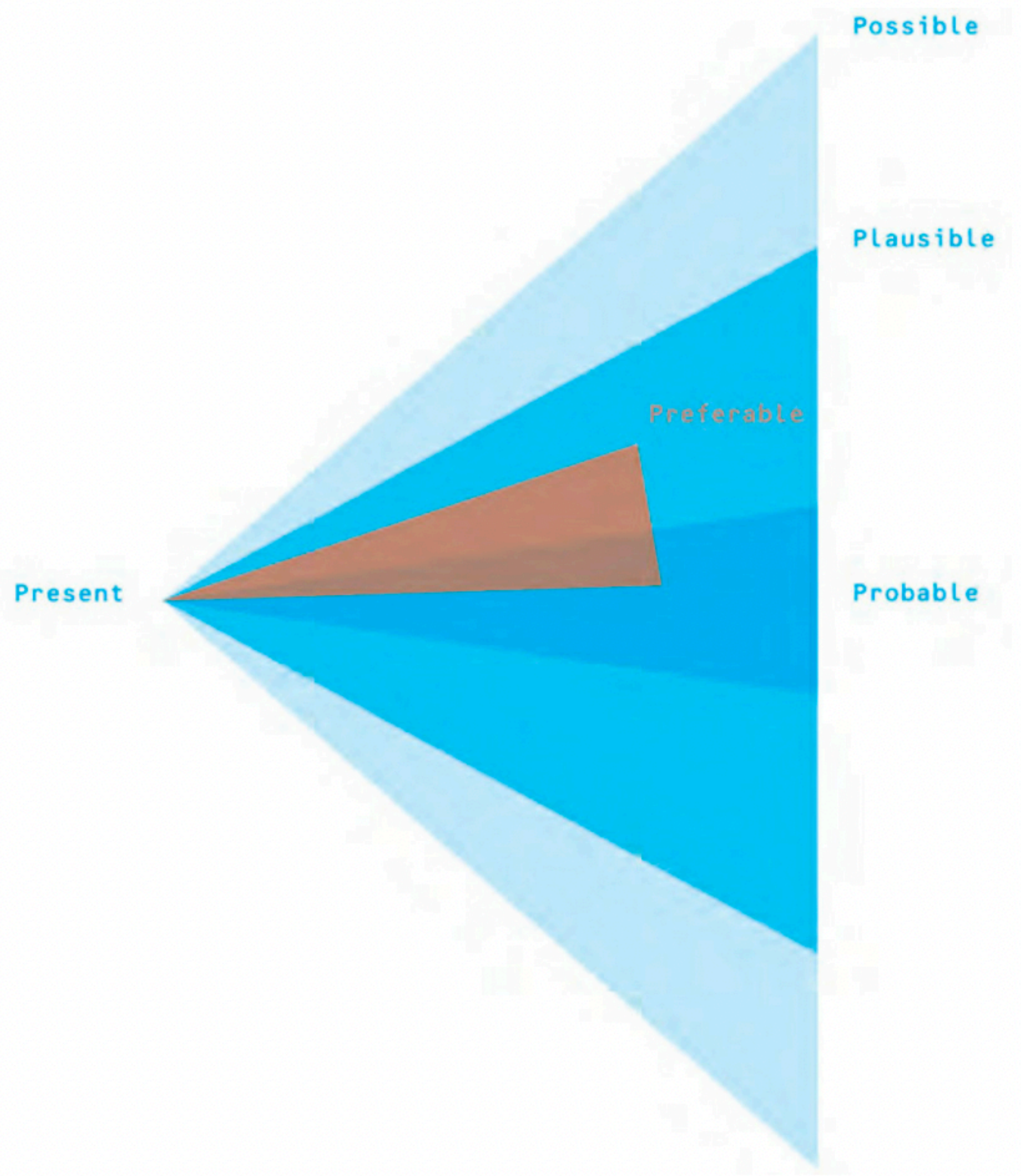
Speculative Design?

A	B
Affirmative	Critical
Problem solving	Problem finding
Provides answers	Asks questions
Design for production	Design for debate
Design as solution	Design as medium
In the service of industry	In the service of society
Fictional functions	Functional fictions
For how the world is	For how the world could be
Change the world to suit us	Change us to suit the world
Science fiction	Social fiction
Futures	Parallel worlds
The “real” real	The “unreal” real
Narratives of production	Narratives of consumption
Applications	Implications
Fun	Humor
Innovation	Provocation
Concept design	Conceptual design
Consumer	Citizen
Makes us buy	Makes us think
Ergonomics	Rhetoric
User-friendliness	Ethics
Process	Authorship

A/B, Dunne & Raby.

Dunne, Anthony; Raby, Fiona. Speculative Everything.

“Design speculation can act as a catalyst for collectively redefining our relationship to reality.”

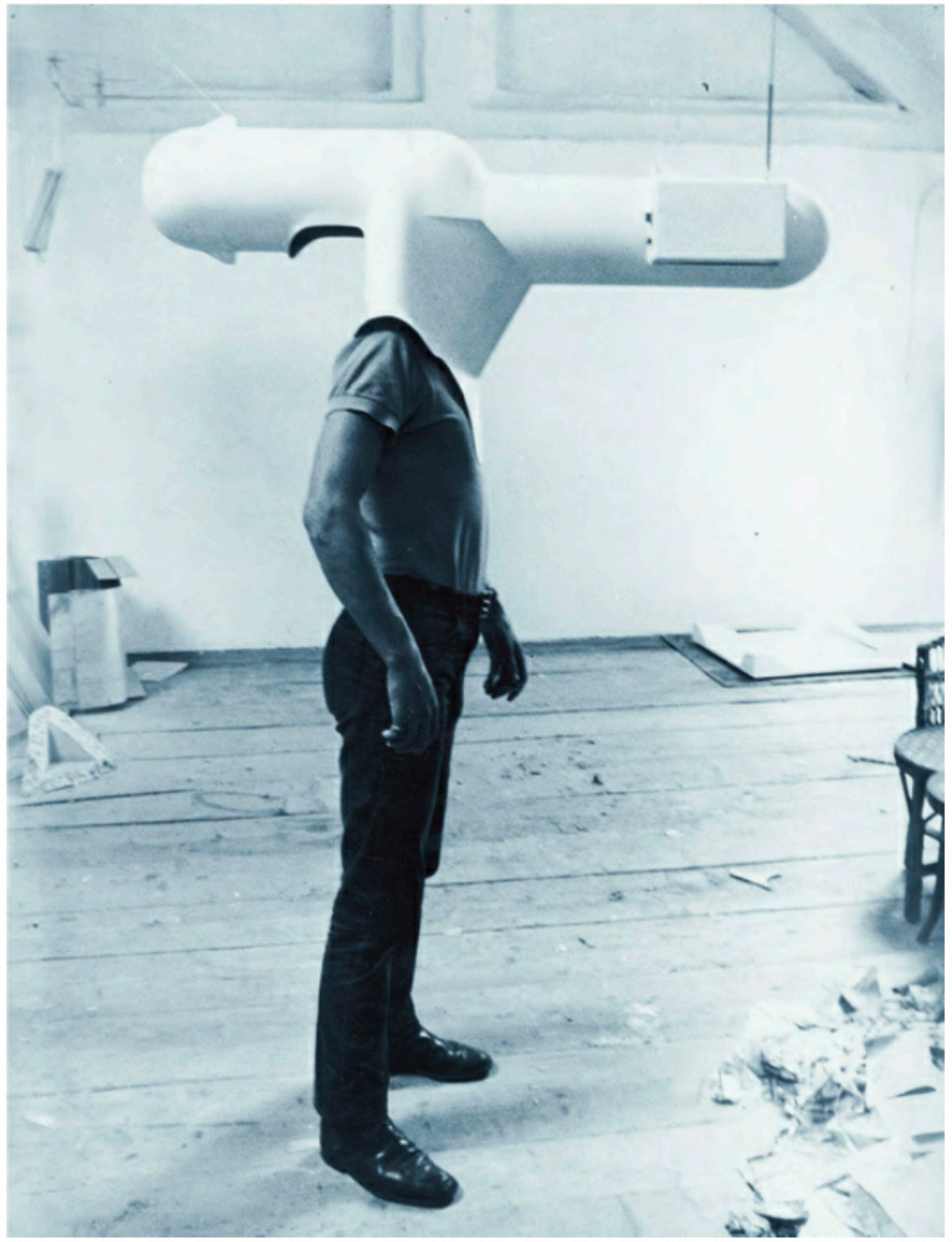


PPPP. Illustration by Dunne & Raby.

Dunne, Anthony; Raby, Fiona. Speculative Everything.

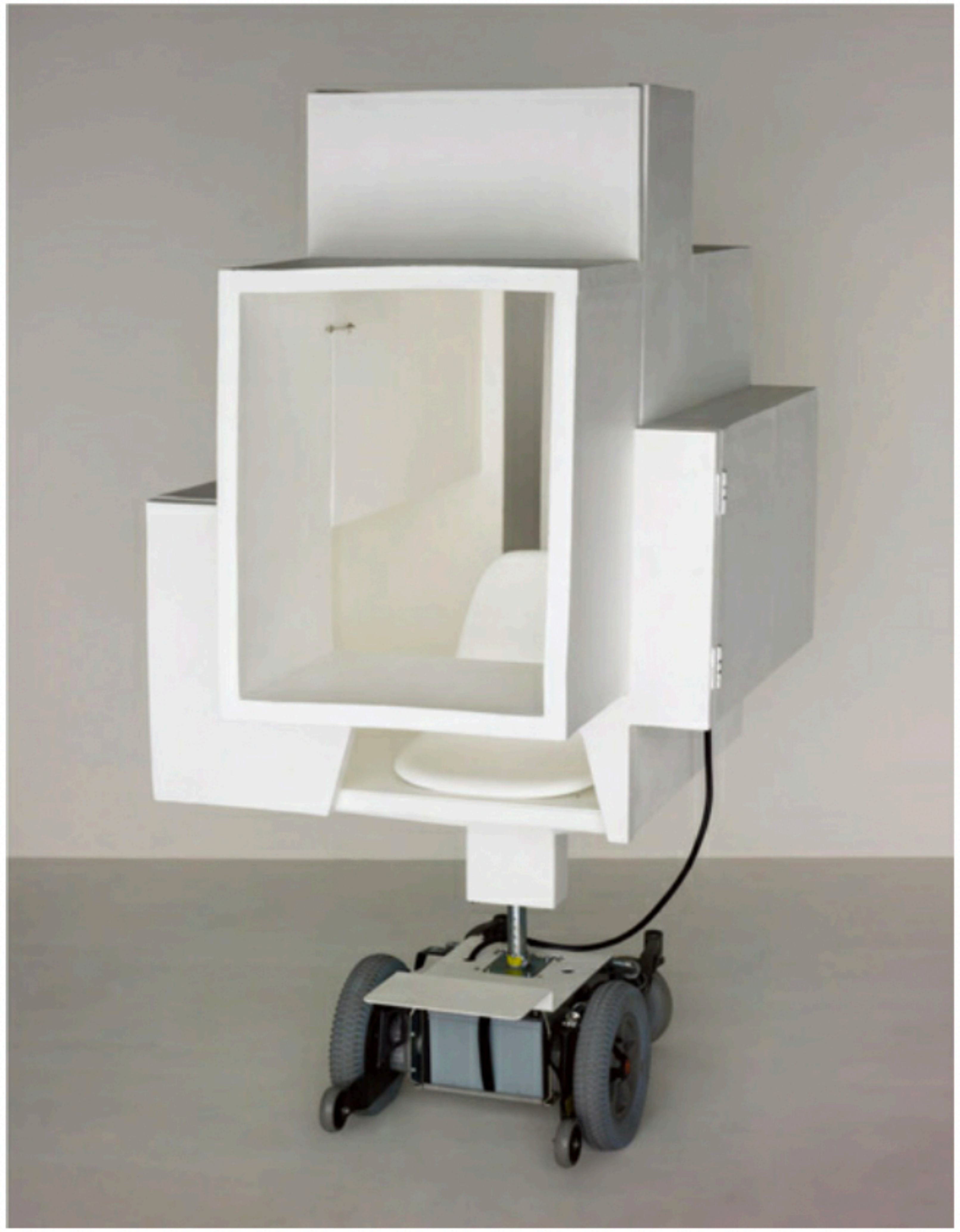
Designers not as experts,
but a catalysts

Dunne, Anthony; Raby, Fiona. Speculative Everything.



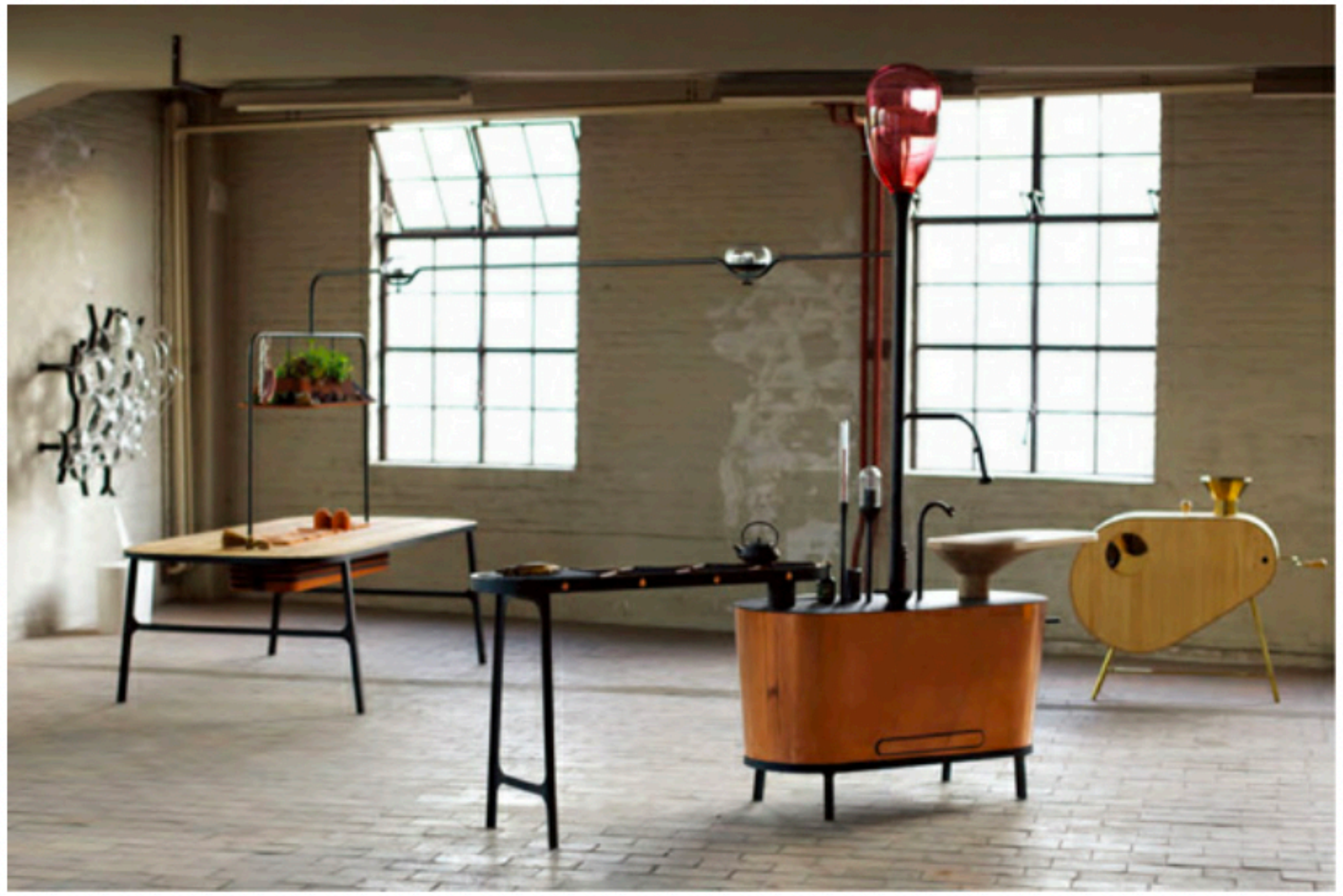
Walter Pichler, *TV Helmet (Portable Living Room)*, 1967. Photograph by Georg Mladek. Photograph courtesy of Galerie Elisabeth and Klaus Thoman/Walter Pichler.

Patrick Stevenson-Keating, *The Quantum Parallelograph*, 2011.



Studio Makkink and Bey/Vitra, *Slow Car*, 2007. Photograph by Studio Makkink and Bey. http://www.studiomakkinkbey.nl.

Ryota Kuwakubo, *Bitman Video Bulb*, 2005. © Yoshimoto Kogyo Co., Ltd., Maywa Denki and Ryota Kuwakubo.



Philips Design Probes, *Microbial Home*, 2011. © Philips.

Dunne, Anthony; Raby, Fiona. Speculative Everything.

Dunne & Raby and Michael Anastassiades, *The Statistical Clock*, 2007–2008. Photograph by Francis Ware. Photograph courtesy of Francis Ware.

Dunne & Raby and Michael Anastassiades, *Huggable Atomic Mushrooms: Priscilla (37 Kilotons, Nevada 1957)*, 2007–2008. Photograph by Francis Ware. Photograph courtesy of Francis Ware.

Design Fiction

https://vimeo.com/122496830

https://vimeo.com/album/5614788

DESIGN FICTION

A construction of a narrative—a movie, animation, written story, presentation or installation—to immerse an audience in an experience that provokes emotional and intellectual responses.

It is the generation of ideas that are not yet possible to provoke a dialogue about what could or should be possible.

http://designresearchtechniques.com/casestudies/design-fiction/

https://medium.com/digital-experience-design/design-fiction-32094e035cd7

DESIGN FICTION

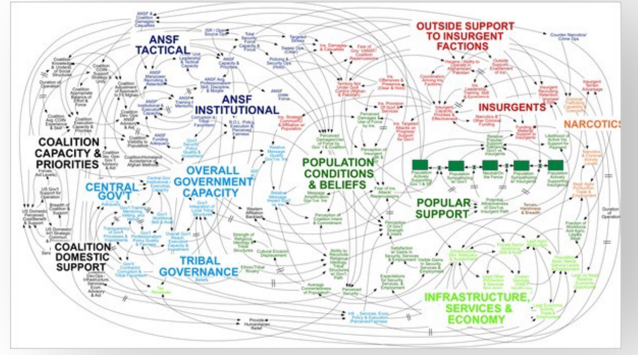
When: During the problem framing, at the boundaries of strategic planning, collective visioning and prototyping, where an organization or agency needs to overcome what isn't possible in order to explore the implications if it were possible.

For: Generating ideas outside of the boundaries of what is deemed possible, thereby encouraging experimentation of "worldviews".

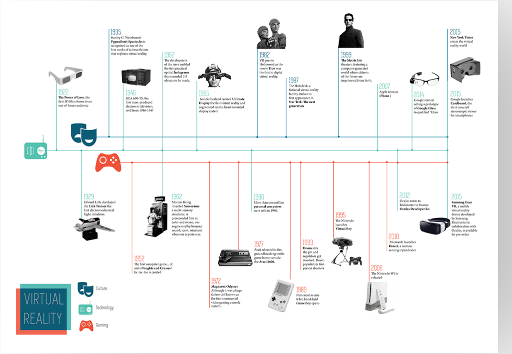
http://designresearchtechniques.com/casestudies/design-fiction/

https://medium.com/digital-experience-design/design-fiction-32094e035cd7

DESIGN FICTION



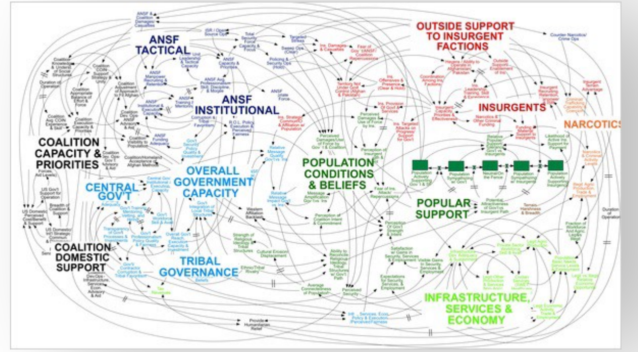
Diffusion Research
(Present Adoption: How, Who, & Why)



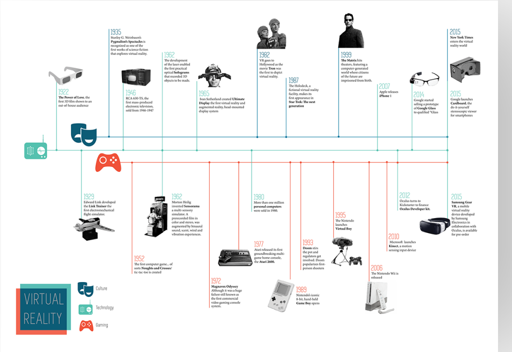
Legacy Map
(Past: Where & What)

1. Gather insights from your existing research

DESIGN FICTION



Diffusion Research
(Present Adoption: How, Who, & Why)



Legacy Map
(Past: Where & What)

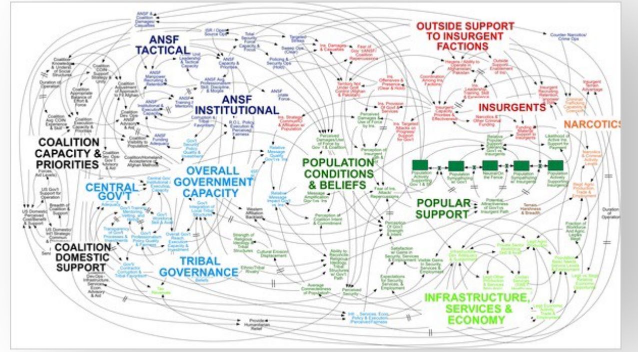
DF Artifact Iteration 01
(Future)

https://youtu.be/w-tFdreZB94?t=138

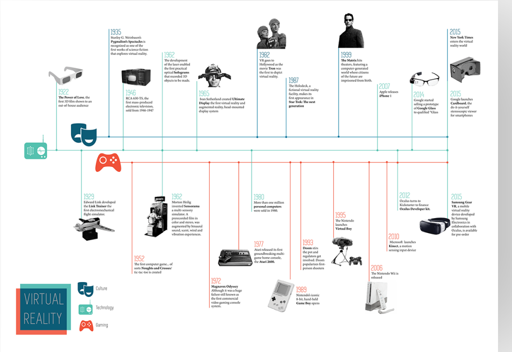
1. Gather insights from your existing research

2. Based on those insights, create a **provocative artifact** (physical object, video, audio, music, installation, etc.) and a story that accompanies the artifact.

Design Fiction



Diffusion Research
(Present Adoption: How, Who, & Why)



Legacy Map
(Past: Where & What)

DF Artifact Iteration 01
(Future)

https://youtu.be/w-tFdreZB94?t=138

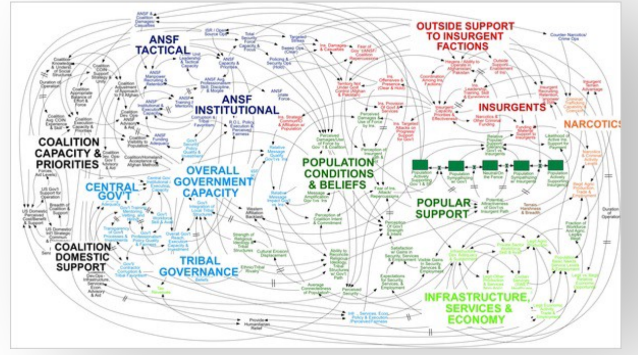
Document Audience
Reaction 01

1. Gather insights from your existing research

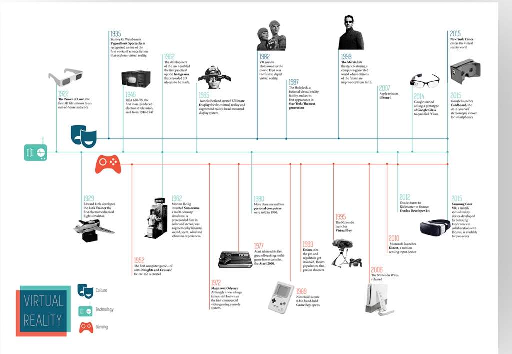
2. Based on those insights, create a **provocative artifact** (physical object, video, audio, music, installation, etc.) and a story that accompanies the artifact.

3. Test the artifact with your colleagues and **document their response**.

DESIGN FICTION



Diffusion Research
(Present Adoption: How, Who, & Why)



Legacy Map
(Past: Where & What)

DF Artifact Iteration 01
(Future)

https://youtu.be/w-tFdreZB94?t=138

Document Audience
Reaction 01

DF Artifact Iteration 02

http://km.cx/projects/merger

Document Audience
Reaction 02

1. Gather insights from your existing research

2. Based on those insights, create a **provocative artifact** (physical object, video, audio, music, installation, etc.) and a story that accompanies the artifact.

3. Test the artifact with your colleagues and **document their response**.

4. Based on their insights, **produce the next iteration and document their response**.

Design Fiction x AI

WIRED

WILL KNIGHT BUSINESS JUN 27, 2022 7:00 AM

DALL-E Mini Is the Internet's Favorite AI Meme Machine

The viral image-generation app is good, absurd fun. It's also giving the world an education in how artificial intelligence may warp reality.

WIRED

WILL KNIGHT BUSINESS JUN 27, 2022 7:00 AM

DALL-E Mini Is the Internet's Favorite AI Meme Machine

The viral image-generation app is good, absurd fun. It’s also giving the world an education in how artificial intelligence may warp reality.

VICE

Artists Are Using AI To Imagine Cities Without Cars

Amateur urban planners are using DALL-E to visualize what cities might look like if they were built for pedestrians and cyclists, instead of cars.

By Janus Rose
NEW YORK, US

July 29, 2022, 4:00pm Share Tweet Snap

IMAGE GENERATED BY DALL-E / ZACK KATZ

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Image-Generating AI Keeps Doing Weird Stuff We Don't Understand

JANUS ROSE

06.01.22

Tech

Inside Midjourney, The Generative Art AI That Rivals DALL-E

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AI model drawing images from any prompt!

The smoke and fume from factories are turned into crystals and powers the flying cars

craiyon

AI model drawing images from any prompt!

The smoke from factories turned into a mushroom in the woods

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AI model drawing images from any prompt!

The smoke from factories turned into a mushroom burger

craiyon

AI model drawing images from any prompt!

The smoke from factories becomes mushroom clouds in the woods

craiyon

AI model drawing images from any prompt!

The smoke from factories transforms into a tree branch

craiyon

AI model drawing images from any prompt!

The smoke from factories transforms into genie from aladdin

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AI model drawing images from any prompt!

The smoke from cars on highway transforms into genie from Aladdin

Your turn

https://www.craiyon.com/

AALTO SUMMER SCHOOL CIRCULAR ECONOMY AND CO-DESIGN 2022

COMPLEXITY SCIENCE & SPECULATIVE DESIGN PRACTICES

MONDAY, AUGUST 1ST, 2022

JEONGKI LIM, THE NEW SCHOOL PARSONS SCHOOL OF DESIGN

PARSONS Aalto University