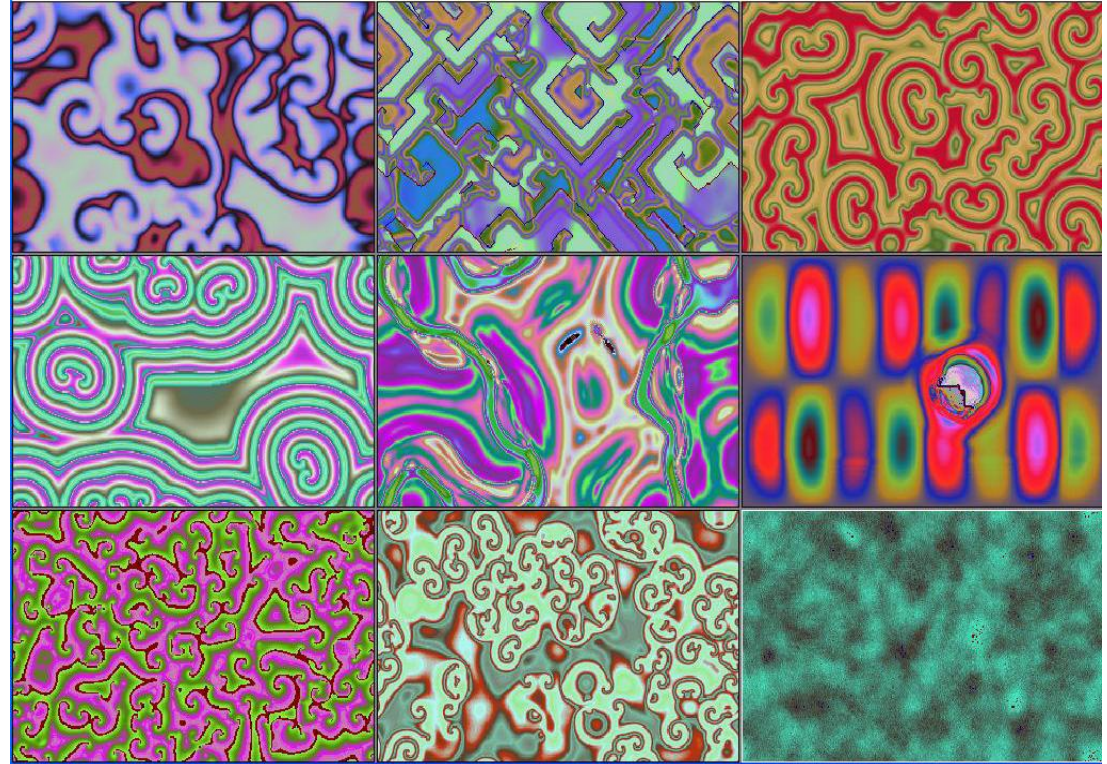


**Life is a Gnarly
Computation**

by Rudy Rucker

**Talk for the Kyoto
“What is Life”
Conference**

October 17, 2007



www.rudyrucker.com

Hylozoism

- ***Hylozoism:***
 - Every object is alive and conscious.
 - Hylozoism = *hyle*, matter + *zoe*, life.
- Rocks, planets, atoms, air currents, electrons, galaxies....
- Test question: *Is a fluttering flag alive?*

Dialectic

- I like dialectic. I am Georg Hegel's great-great-great grandson!
- Some ideas for this talk are from my non-fiction book with a dialectic title.
The Lifebox, the Seashell and the Soul.

THE LIFEBOX,
THE SEASHELL,
AND THE SOUL



WHAT GNARLY COMPUTATION
TAUGHT ME ABOUT ULTIMATE REALITY,
THE MEANING OF LIFE, AND HOW TO BE HAPPY

RUDY RUCKER

The Lifebox, the Seashell and the Soul

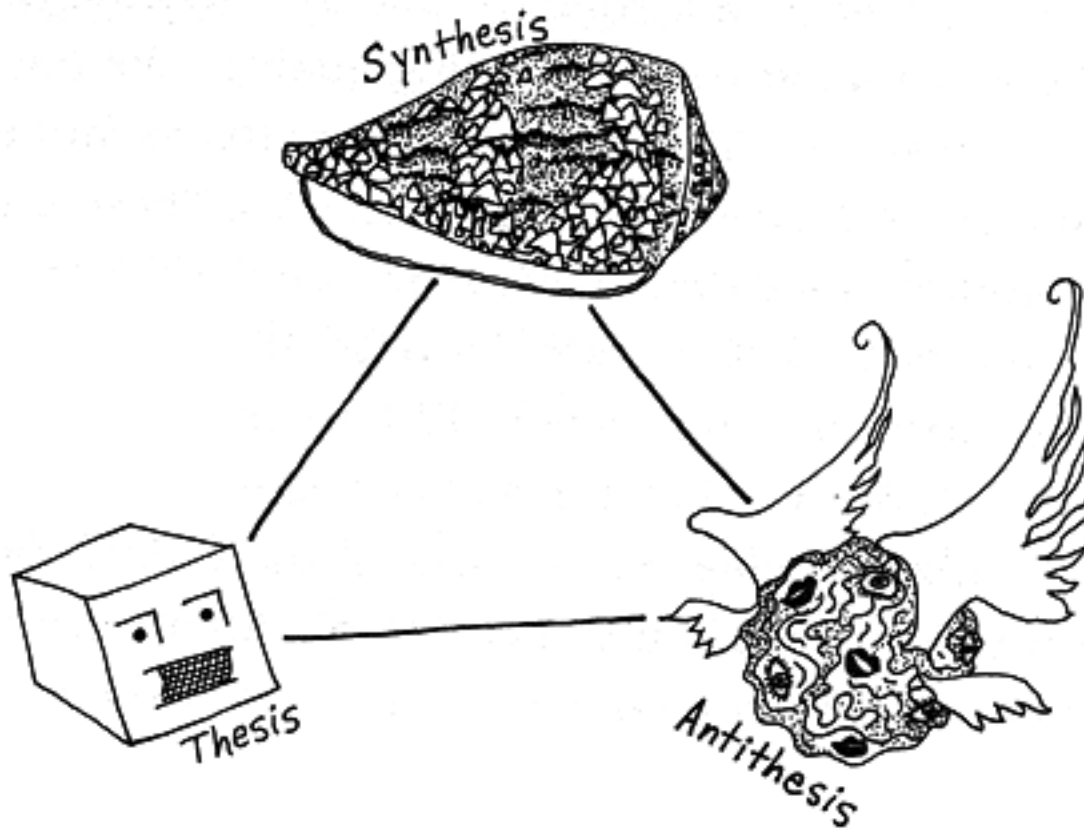
**What Gnarly Computation
Taught Me About
Ultimate Reality,
The Meaning of Life, and
How to be Happy**

(Thunder's Mouth Press, 2005)

My Book Title is a Dialectic Triad

<i>Thesis</i>	Lifebox
<i>Antithesis</i>	Soul
<i>Synthesis</i> <i>(Escape)</i>	Seashell

Dialectic Triad



THESIS: “Universal Automatism”

The world is made of computations.

- A *computation* is a process that obeys finitely describable rules.
- The world consists of *many* computations at high and low levels. There need not be a single underlying master computation.
- The *human mind* can be modeled as a collection of data and algorithms that I call a **lifebox**.

ANTITHESIS: Life Doesn't *Feel* Like a Computation

- The feeling of being alive. “I am.”
- Consciousness as merging with the world.
- Dreams.
- Visions of God.
- The **soul**.

SYNTHESIS (Escape):

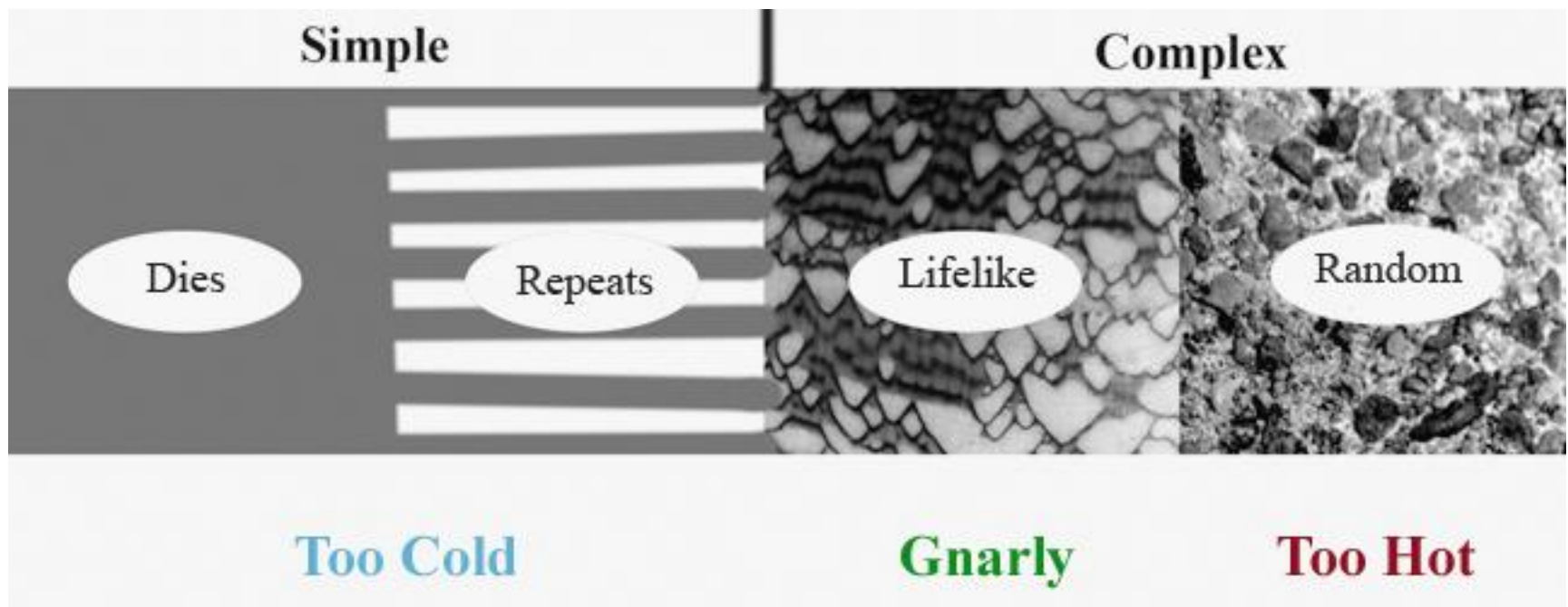
Gnarly Computations Are Lifelike.

- Gnarly = Complex and unpredictable
- *Thesis*. Living things are computations.
- *Antithesis*. Living things don't seem like computations.
- *Escape*: Living things are gnarly computations.

A Seashell Example

Cone Shell With Gnarly Cellular Automata Computation.





- **Simple (Too Cold):** Dies Out or Repeats.
- **Gnarly (Just Right):** Complex, moving, unpredictable. Life. Natural processes.
- **Looks Random (Too Hot):** Seething.

Gnarly 2D CAs: CAPOW Zhabotinsky Scrolls



Theoretical Consequences of Gnarly Science

- (*Principle of Computational Equivalence*).
Nearly everything in nature is gnarly.
Nature is full of universal computations.
- (*Principle of Unpredictability*)
Gnarly natural processes are unpredictable.
Nature can't be simulated faster than events occur.

Gnarl is Everywhere

- Even a motionless rock is gnarly.
- Think of the atoms as balls connected by vibratings springs.
- Or think of the rock as a massed quantum computation.
- Or look at a Zen garden!

But What About Life?

Surely life is more than just a gnarly computation. What else is needed?

- **Life = Gnarly Computation + Memory**

Memory in Living Things

- *Genetic* memory: DNA.
- *Organism* memory: Immune system.
- *Behavior* memory: Neural patterns.

Is A Fluttering Flag Alive?

- A fluttering flag is a gnarly computation.
Is it alive?
- Recall:
$$\text{Life} = \text{Gnarly Computation} + \text{Memory}$$
- So, to be “alive,” the flag must remember its earlier states?

Koan

- *Thesis: Flag* is moving.
- *Antithesis: Wind* is moving.
- *Synthesis (Escape): Mind* is moving!

Can The Flag Remember?

- *Thesis*: Natural systems are dissipative, they don't remember.
- *Antithesis*: A universal memory upgrade adds memory to every point in space! (See my novel *Postsingular*.)
- *Escape*: The One Mind already remembers for each object. The upgrade is in place!

Rudy Rucker,

The Lifebox, The Seashell and the Soul

Nonfiction. (Thunder's Mouth Press, 2005).

www.rudyruicker.com/lifebox

Postsingular

Novel. (Tor Books, 2007).

www.rudyruicker.com/postsingular

Blog: www.rudyruicker.com/blog