generative art alife + postbiology

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<table>
<thead>
<tr>
<th>Traditional</th>
<th>Computational</th>
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<tr>
<td>unique, rare, precious</td>
<td>replication, multiplication</td>
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<td>human genius (“the hand”)</td>
<td>enabled machines (code)</td>
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<tr>
<td>inscription</td>
<td>transformation (data)</td>
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<tr>
<td>representation</td>
<td>simulation, activity (virtuality)</td>
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<td>viewing (“the gaze”)</td>
<td>participation (interactivity)</td>
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<td>+</td>
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<td>individuality</td>
<td>systems</td>
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<td>finishing</td>
<td>searching</td>
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What a computer is: hardware + software + DATA to be operated on

Special considerations that arise in computer art-making

Automata: Greek “pneumatica”; the “monkbot”, Maillardet’s “Philadelphia draughtsman”, al-Jazri’s elephant clock; Vaucanson’s “digesting duck”; the Mechanical Turk

Charles Babbage and the continuum from calculating machines to the earliest computer

Ada Lovelace and the invention of programming

Lifelike machines: Metropolis, robots by Nam Jun Paik, Andy Warhol, and Ed Kienholz; Jean Tinguely’s painting machines

The “uncanny valley”
areas we’ll be looking at in this course:

lifelike machines / automata
responsive installation
telematic and net art
social media
immersive games
**generative art**
database art
**artificial life art**
virtual worlds
hacktivism
Some of the things that computer artists examine and question in these kinds of works:

- the concept of REPLICATION without degradation
- the implications of RESPONSIVE systems
- what we mean by the term LIFELIKE
- our fascination with RULE SYSTEMS
- the locus and status of AUTHORSHIP
- the appeal of RANDOMNESS
- GAME and PLAY spaces as speculative fictions
- what it means to conceptualize art in terms of DATA
- the NETWORK as a domain of social power
variations on a theme
generative parameters for the haystacks

- 1 or 2 thatched haystacks; no other objects/humans
- middle distance framing
- Renaissance rules of perspective
- human POV (5-6 feet off ground)
- center-third positioning
- variable time of day
- oil on canvas, using Impressionist technique
“In the vast Library there are no two identical books.”

making multiples

simple serial production
make something, then make something different

thematic production (Monet’s haystacks)
make something based on idea 1, then make something else also based on idea 1

rule-based generation
generate works according to a rule system, sometimes in steps or generations
add chance, as in aleatory art (ca. 1955)

ex.: work by composers like John Cage or Karlheinz Stockhausen

Marcel Duchamp, *3 Standard Stoppages*, 1913
add ‘automatic’ techniques as the Surrealists (ca. 1930)

ex. decalcomania, frottage, exquisite corpse

Max Ernst, *Epiphany*, 1940
add new rules, as in some forms of Minimalism

ex. Sol LeWitt’s wall drawings

Sol Lewitt, *All Combinations of Arcs from Four Corners, Arcs from Four Sides, Straight Lines, Not-Straight Lines and Broken Lines*, 1940
Life is played on an arbitrary-sized grid of square cells. Each cell has two states: ‘dead’ or ‘alive’. The state of every cell changes from one ‘generation’ to the next according to the states of its 8 nearest neighbors:

- live cell with 1, 4, 5, 6, or 7 neighbors = death
- live cell with 2 or 3 neighbors = alive
- dead cell with 3 live neighbors = alive
- dead cell with 1, 2, 4, 5, 6, or 7 live neighbors = dead

Here black = alive.
game of Life (4 states)

Try out “Golly”: free, downloadable Life applet for Mac
“Biomorph” software

http://www.well.com/~hernan/biomorphs/
There is no universally accepted definition of life.

Scientists generally agree that organisms exhibiting **most or all** of the following are alive:

- organization (structure)
- metabolism (energy conversion)
- homeostasis (self-regulation)
- growth
- adaptation (learned and/or heredity)
- responsiveness to stimuli
- reproduction
- motion
- carbon-based formation

Inclusion remains highly debatable for viruses and artificial life forms.
William Latham is a British sculptor and programmer who developed a method for “breeding” his objects from simple ancestral forms following rules similar to those that operate in biological evolution. His earliest works were “bred” using paper-and-pencil and output as traditional physical sculptures. His later work has been bred using software and output as digital prints of the virtual sculptures.

Right: William Latham surrounded by some of his evolved virtual sculptures.
An early Latham drawing of evolved forms (reads left to right)
Latham at work on one of his “Form Synth” trees
Hand-drawn “Form Synth” tree (left) with resulting Form Synth sculpture (right)
William Latham, process

**STRUCTURE**
e.g. tree or shell

**GENES**
rules of inheritance

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**FORM GENERATOR**

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**DRAWING/RENDERING SYSTEM**

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**FINAL IMAGE**
Plant Form, 1989. Cibachrome print, 44x44 inches.
Left: Different views of the same virtual sculpture (model) as seen by viewer.

Right: diagrams showing shifting points of view of virtual camera that result in images at left.
William Latham, evolved drawings

Test tree, ca 1987.

Evolved forms, 5 generations, ca. 1990.
William Latham

*Tusk 10*, 1990. Cibachrome print, 60x60 inches.
Pages from biologist Ernst Haekel’s drawings of actual sea creatures, showing strong similarities to Latham’s artificially evolved forms.

http://www.rarebooksberlin.de/fileadmin/haeckel_artforms.pdf
Will Wright, SimLife game, ca. 1992
Karl Sims, “Evolved Virtual Creatures”

The web interface for creating a creature to set loose in the Technosphere virtual wildlife park. Creatures vary in form but are all either herbivores or carnivores.
A creature “in the wild” of the Technosphere virtual wildlife park.
Various views of creatures in the Technosphere virtual wildlife park.
An updated version of the Technosphere wildlife creation interface.
A-Volve, 1993-94. Interactive installation with software creatures projected onto real water, responding to the motions of the visitors’ hands.
Life Spacies, 1997. Interactive installation for which emails sent by players served as the “DNA” to make the virtual creatures. Letters of the alphabet also served as food for these creatures.
Life Spacies II, 1999. Updated version with more complexity in how language is used to form the virtual creatures. In this version, creatures also react to visitors’ presence.
Christa Sommerer & Laurent Mignonneau

*Life Spacies II*, 1999, installed at UC Irvine’s Beall Center
Christa Sommerer & Laurent Mignonneau

“Creation is not understood anymore as an expression of the artist’s inner creativity or ‘ingenium’; instead, it becomes an intrinsically dynamic process that is based upon the interaction parameters and the evolutionary ... processes of the work.”

http://www.interface.ufg.ac.at/christa-laurent/WORKS/FRAMES/FrameSet.html
Latent Figure Protocol, BioArt, 2007. Image formed by seeding a reactive gel with DNA and sending through an electrical current.
BioArt sampler for future reference:

pigeon breeding: Andrea Zittel

iris breeding: George Gessert

mold breeding: Gail Wight, Beatriz da Costa

bioluminescent rabbit breeding: Eduardo Kac

growing a quarter-scale human ear on own body: Stelarc

building a cockroach-driven vehicle: Garnet Hertz