Robert Spahr

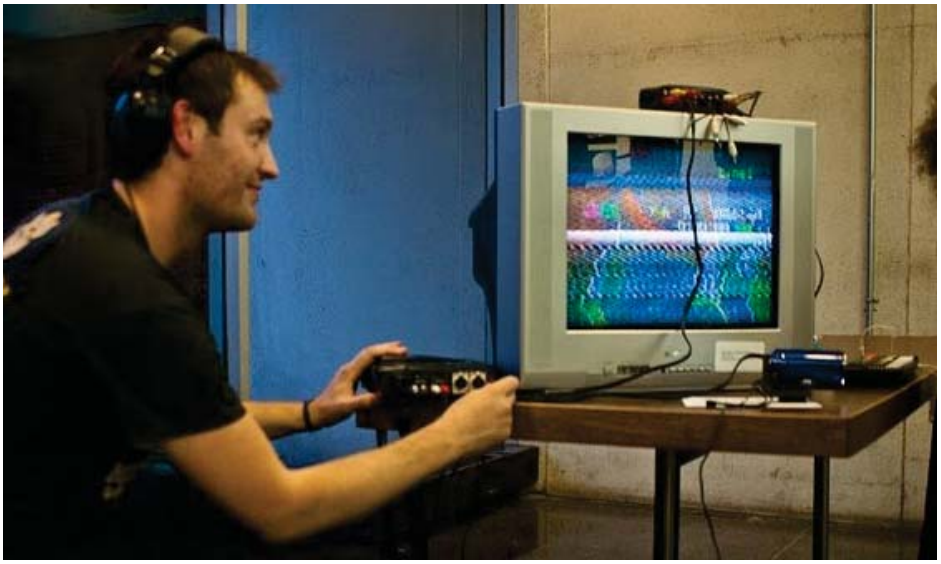
Paper: **Toward a Pedagogy of Generative Art**

Abstract:
In the Spring of 2011, I developed and taught a course in generative art within the New Media track of the Cinema curriculum at my university. The students ranged from junior and senior undergraduates in cinema, as well as interdisciplinary MFA and PHD graduate students.

Because of the range of students, this course introduced concepts of generative and algorithmic art through historical examples such as Dada, Happenings, Fluxus, Systems Esthetics, and Conceptual art. Students were encouraged to investigate art created by simple sets of rules, chance operations, genetic algorithms, cellular automata and generative processes found in nature.

Students with no previous programming experience were exposed to the creative possibilities of computational art using HTML, Javascript, Processing and Arduino hardware. The class explored issues of new media, such as modularity, automation, and variability, as well as the creative possibilities of the computer interface, computer operations, and the database.

Through creating generative art, students began to question previous assumptions about originality, creativity, and craft, as well as the role of the artist within the creative process. This course helped students expand their current art practice to include generative processes while further exploring and developing their personal artistic voice.



Cory Fehrenbacher interacting with sound and image glitch, made by Nichole Nicholson and Sam Sloan, in the class Generative Art, 2011

Topic: Pedagogy of Generative Art

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References:
[1] Lev Manovich, "*The Language of New Media*", MIT Press, Cambridge, MA, 2001

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Toward a Pedagogy of Generative Art

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1. Abstract

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In the Spring of 2011, I developed and taught a course in generative art within the New Media track of the Cinema curriculum at my university. The students ranged from junior and senior undergraduates in cinema, as well as interdisciplinary MFA and PHD graduate students.

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2. Background: Developing My Own Generative Art Processes

“I can't understand why people are frightened of new ideas. I'm frightened of the old ones.” [1] - John Cage

In this paper I will briefly outline my own development as an artist and the current generative art I produce, followed by a description of the cinema curriculum at the university where I teach, and how I then developed a course in generative art.

My evolution as an artist followed a path that began in a visual art tradition of post-minimalist sculpture. At this time I was making objects out of wood, plaster, tar and

wax that embraced random occurances from the materials themselves. Soon after I read the essay *The Work of Art in the Age of Mechanical Reproduction*, by Walter Benjamin [2], my work opened up to installation and performance that contained objects, images, smells and processes that I set into motion, yet had an autonomy independent of me as the artist. I felt it was now possible for me to create work from potentially any materials, with an emphasis on duration and random processes.

Fluids, Feb 26, 1994

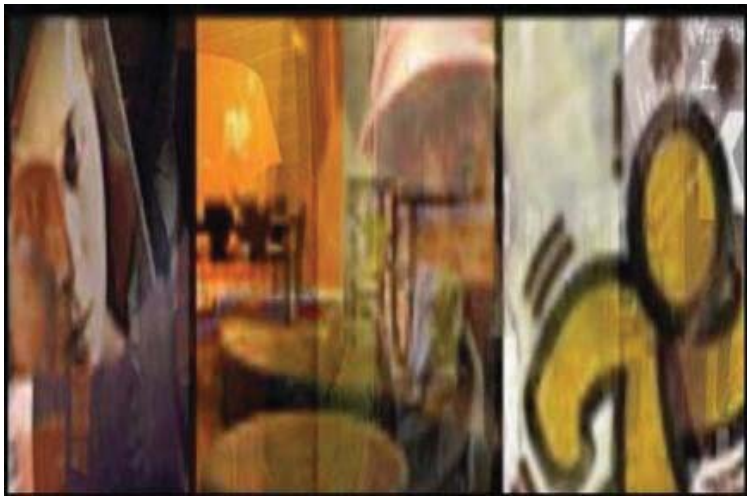
2.1 Technical Skills, Computational Art and Generative Processes

In the late 1990's in New York City, I participated in the dot com bubble as a web developer and designer. My technical skills included basic computer programming that I then began to include in my art practice. Two almost simultaneous events were the catalyst for my current series of generative art works. The dot com bubble burst, quickly followed by the attacks on the World Trade Center on September 11th, 2001.

I became frustrated with the way the main stream media was presenting ideas and images that affected our world view. The ever present cable news cycle pushes a daily message of fear, filled with political polarization; domestic and foreign terrorism; recent kidnapped white girls; celebrity scandals; and the imminent threat of hurricane, earthquake or flood. I began to think about how these digital images and text operated, one day influencing our daily discourse, the next day vanishing without a trace. Digital leftovers reminded me of redundant computer programming. Code that was once useful, but later forgotten and obsolete.

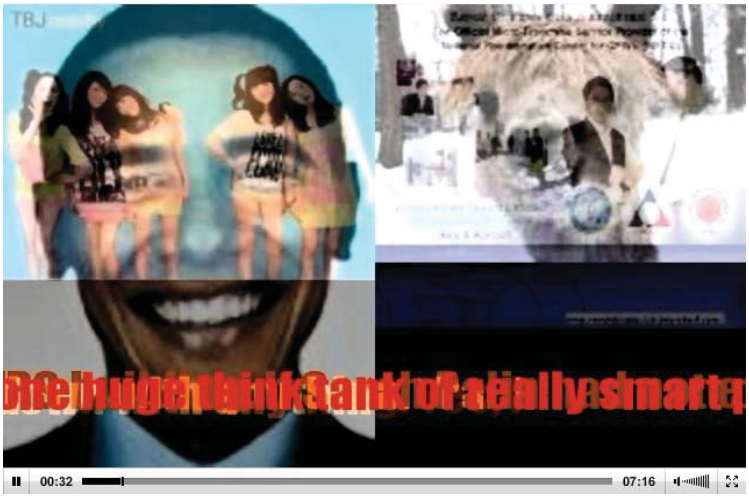
Since 2003, I have borrowed the computer hacker term 'Cruft', defined as an unpleasant substance; excess; superfluous junk; and redundant or superseded computer code. [3] To create this work I call CRUFT, I write simple algorithms that an automated computer system follows. The instructions outline what websites to target, and the stystem then downloads selected images and text which are then used as source material, and remixed to create new artwork on a schedule that imitates the 24 hour cable news cycle.

2.2 Recent Cruft Images



Hourly Cruft (2003-present) http://www.robertspahr.com/work/hourly/

This cruft algorithm extracts images from the NYtimes home page once every hour. The images from this page are then manipulated to generate the three panel overlapping "cruft." Over time the changes or lack of change seen in the crufts reflect the news cycle of the NYtimes.com site.



Load (Limbaugh) Cruft (2010-present) http://www.robertspahr.com/work/load/

This Load Cruft is the result of my consuming and digesting the words of Rush Limbaugh as well as the associated images offered up by the Internet. This algorithm begins by downloading daily quotes from Limbaugh's talk radio show, and passing his individual words as search terms into Altavista Image Search. The results are processed using a genetic algorithm, creating a daily cruft of incendiary text and image. downloading digital leftovers as source material to then be remixed into a collaged composite.

3. Challenges: Generative Art & New Media in a Cinema Curriculum

One of the challenges I first had when I was hired to teach new media at Southern Illinois University Carbondale, was to figure out how new media would work within a tradtional cinema curriculum. The students learned basic narrative, documentary and experimental filmmaking using 8mm and 16mm film stock, as well as digital video and HD video. The Cinema and Photography department has an equal amount of faculty teaching studies courses and production courses. I looked to the writings of Lev Manovich, and specifically his book *The Language of New Media*, [4] as a guide in thinking about new media as an extension of the language of cinema.

I quickly developed a course called *New Media Production* [5] and a companion studies course called *History of New Media*. [6] These two newly created courses followed the curriculum structure of tracks of study consisting of a studies course and a production course. Now students could choose several tracks either in narrative, documentary, experimental and new media. The curriculum also had a more general course listing called 'Experimental Strategies.' Each time this course was offered, the specific topic would change depending on the faculty member teaching it. This is where my generative art course fit within the cinema curriculum. In that gap between experimental filmmaking, and the study of new media.

3.1 Generative Art Course

My course called *Generative Art* [7] needed to serve a large and varied population of students within our college of Mass Communication and Media Arts. In the spring of 2011, I developed and taught a course in generative art. The students ranged from junior and senior undergraduates in cinema and photography, as well as interdisciplinary MFA and PHD graduate students.

Each student was coming to the class with a variety of technical skills. Many of the graduate students were well on their way in developing their own artistic voice, compared to some of the undergraduate students who had only just begun the journey. So I created a course introducing generative art in a way that would appeal to this broad range of students. As a group we discussed generative art, and for the purposes of the course, accepted the following definition:

“Generative Art can be defined as any analog or digital art practice, that incorporates instruction-based, mechanical, organic, computer-controlled, and/or other external, random, or semi-random processes and/or apparatuses directly into the creative process, which is then set to motion with some degree of autonomy contributing to or resulting in a work of art.”

Most of my students came to the class thinking of themselves as either filmmakers or photographers. I worked to create a culture where they could safely experiment, explore, and develop as artists. The course was arranged for them to make two individual projects, and one collaborative exhibition. In fact what happened was that I had the student create weekly experiments. I described them as sketches. Creating the quantity of work; weekly explorations, greatly increased the quality of work. It became a matter of discussion as to where does a weekly exploration end, and where does a 'finished' piece begin.

3.2 Course Topics and Objectives

Topics

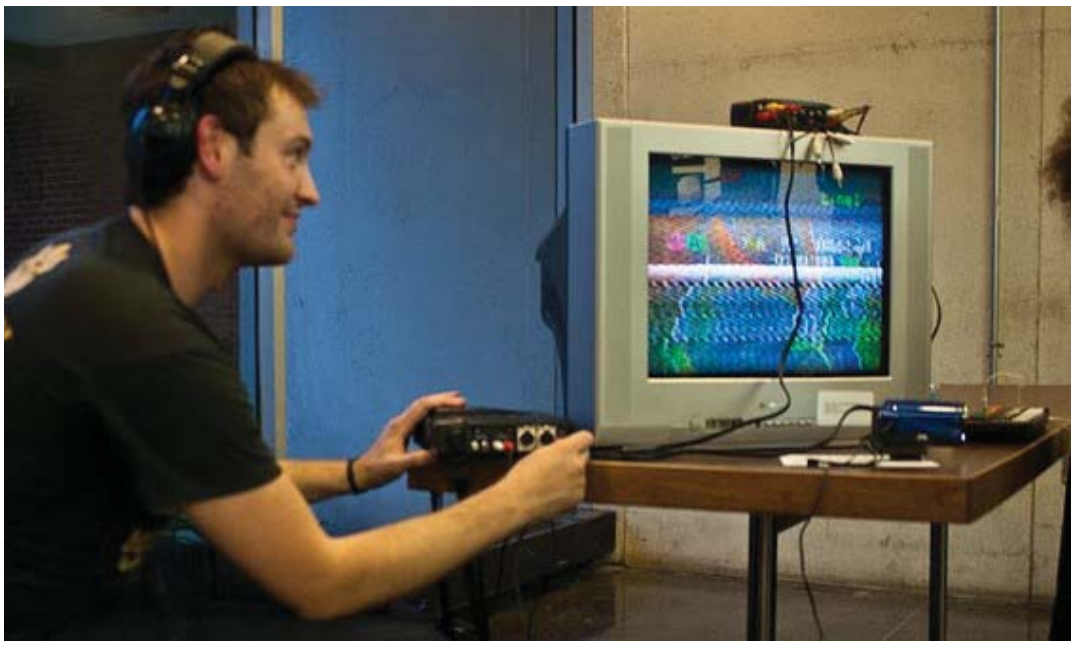
- Chance / Randomness / Systems
- Computational Art (Processing and Arduino)
- Dada, Happenings, Conceptual Art, Minimalism, and Fluxus Art
- Art Practices / Open vs Closed / Centralized vs. Decentralized Networks
- Cellular Automata / Conway's Life
- Genetic Algorithms

Objectives

- Develop an understanding of algorithmic art
- Explore and develop their own artistic voice
- Identify historical precedents and artists using generative processes
- Understand the role of simple recipes and computer code, as well as random processes to discover new artistic form and expression

Students were exposed to the history and current practice of generative art, and to consider the use of chance and automation, which brings into question assumptions about originality, creativity and craft, as well as the role of the artist within the creative process. The students explored issues of new media, such as modularity, automation, and variability, as well as the creative possiblities of the computer interface, computer operations, and the database. This course was taught as a production/studio class, but was combined with critical readings and discussion.

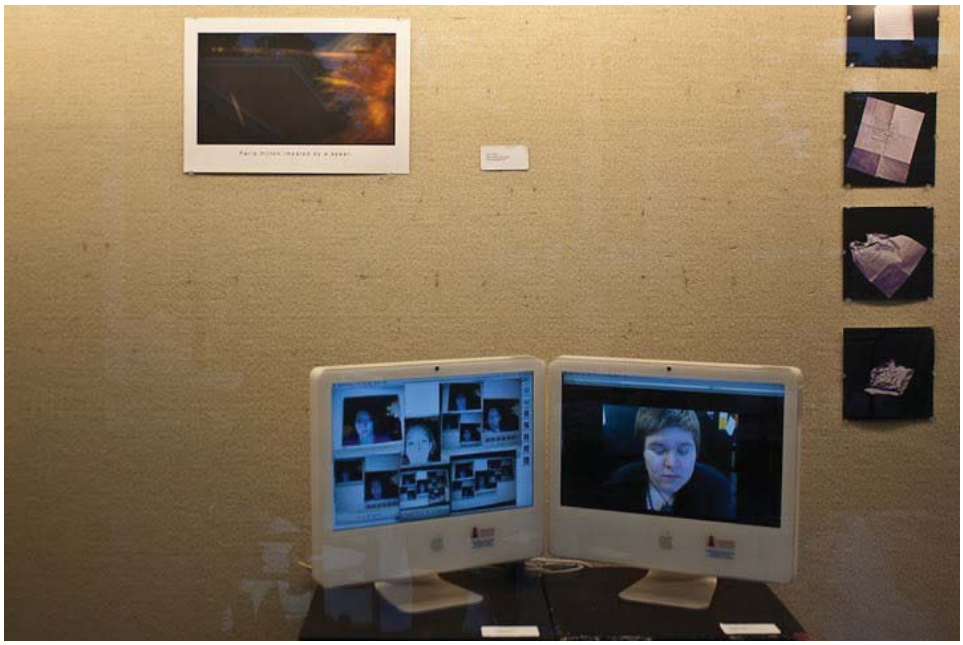
4. Examples: Selected Student Work of the Generative Art Class



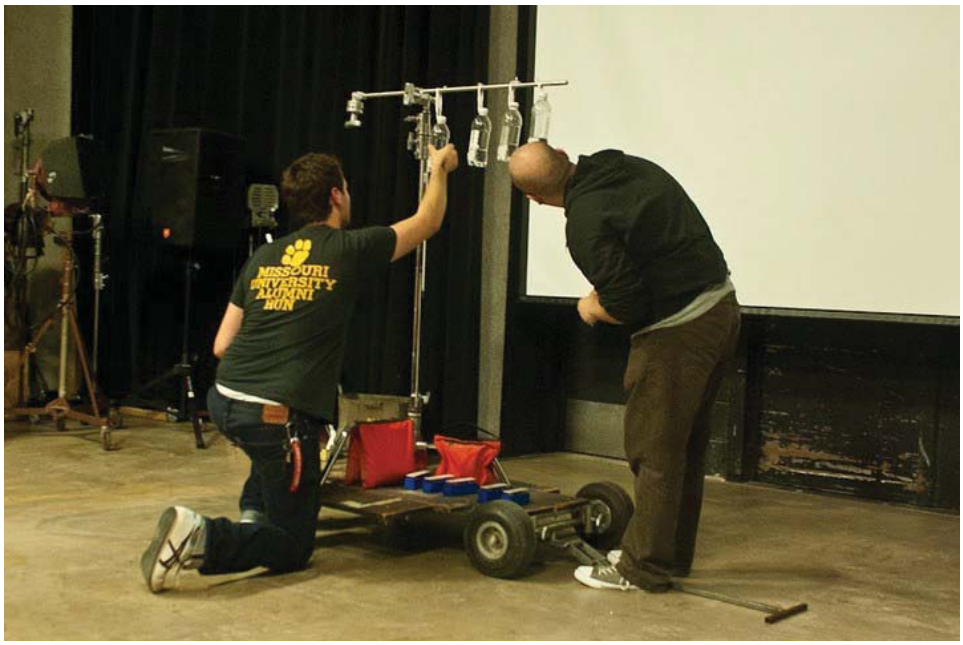
Cory Fehrenbacher interacting with sound and image glitch, made by Nichole Nicholson and Sam Sloan, in the class Generative Art, 2011

Exhibit of Generative Net.Art, in the class Generative Art, 2011

Exhibit of Generative Documentation, in the class Generative Art, 2011



Work by Patrick Mulcrone, Ana Paula, Adrienne Foster and Danielle Williamson, in the class Generative Art, 2011



Cory Fehrenbacher and Deron Williams, in the class Generative Art, 2011

5. Conclusion: The Role of Generative Art in a Cinema Curriculum

Generative Art allowed the students to explore new techniques and media such as installation, performance, and computer code. This freedom and exploration, as well as forcing them to work quickly with very little self-consciousness; to consider their role as the artist and the context of interactivity, the viewer and where the work will be seen; allowed them to develop a body of work that has since influenced their other media-making. Many of these students are cinema and photography majors, and the ideas in this course have since influenced them as artists, becoming a permanent part of their creative vocabulary and process.

6. References

[1] Kostelanetz, Richard. Conversing With Cage, Edition 2. New York: Routledge, 2003, p. 221. Print.

[2] Benjamin, Walter. “The Work of Art in the Age of Mechanical Reproduction.” Illuminations: Essays and Reflections: Walter Benjamin, Hannah Arendt, Harry Zohn: Books 13 Jan. 1969.

[3] Raymond, Eric S. “The Jargon File, version 4.4.8”
06 Nov. 2011 <http://catb.org/jargon/html/C/cruft.html>.

[4] Manovich, Lev. The Language of New Media. Cambridge: MIT Press, 2001.

[5] Spahr, Robert “New Media Production”
06 Nov. 2011 <http://www.robertspahr.com/nmp/>.

[6] Spahr, Robert “History of New Media”
06 Nov. 2011 <http://www.robertspahr.com/hnm/>.

[7] Spahr, Robert “Generative Art”
06 Nov. 2011 <http://www.robertspahr.com/gen/>.

Ryuji Takaki

Paper: **EDUCATIONAL SYSTEM OF SCIENCE ART FOR STUDENTS OF ART AND DESIGN**

Topic: Teaching Theory of Science Art

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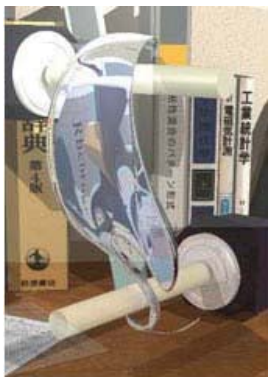
Abstract:
The science art is defined here as a kind of art created with strong scientific mind. There are two kinds of science art; one is an art created with a scientific method which is being developed, and the other is an art expressing a scientific concept. The generative art occupies the major part of the first kind.
The present author, after the career of many years as a physicist, began in 2004 to establish an educational system of science art for graduate students of art and design at Kobe Design University, Japan.
In my course of the University students observe natural (physical, chemical and biological) phenomena or their simulations with brief introductions of their mechanisms. After that they are encouraged to create artworks based on their impressions which they have had during the observation. Although they have no training of scientific activity, they are eager to observe real phenomena, and try to create artworks based on what they have felt in the observation. The important point in developing this educational system is to choose suitable natural phenomena.
In the presentation of this paper total system of the education is introduced, and some examples of artworks created with definite algorithms are shown (see figures below). Although students follow processes of the algorithms, they prefer deforming their results or combining them with other images by arbitrary manipulations.
The present author believes that the artworks created by algorithms, which simulate natural phenomena, should be attractive in principle, because we have grown up while observing natural phenomena around us. Therefore, it is a good strategy to apply such algorithms to production of art and design.



Left: Relief of snow crystal by N. Nagahama (2007), created by following an algorithm of crystal growth mechanism.
Middle: Rheo-art by S. Tomioka (1998), which shows deformation of a spherical dyed part in a viscous fluid owing to two rotating cylinders. The deformed part is expressed as a transparent material with ray-tracing.
Right: River branching system by T. Yamashita (2007), created by die throwing and merging principle of streams.

References:
[1] Ryuji Takaki, "Proposal of a new kind of art "Rheo-Art"", FORMA, Vol.9, pp.203-208, 1994 (http://www.scipress.org/journals/forma/abstract/0903/09030203.html)
[2] RyujiTakaki, "Interaction of Science and Art through Educational System", Visual Mathematics, Vol.10, No.3, 2008 (http://www.mi.sanu.ac.rs/vismath/takaki2008/index.html)

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Keywords: science art, simulation of nature, educational system