README IOO

TEMPORARY
SOFTWARE ART
FACTORY

readme 100

DORTMUND 2005

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To: <spectre@mikrolisten.de>, <nettime-
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Subject: Maximum emotions for minimum budget!
Readme 100 software art factory
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**ANNOUNCEMENT**
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README 100 — Temporary Software Art Factory
Festival for Software Art and Cultures
http://readme.runme.org
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**MAXIMUM EMOTIONS FOR MINIMUM BUDGET!**

Why pay more? Why spend big bucks on visiting big media
art festivals? Why rush between noisy venues, end-
less lectures and art works no one is there to
explain? Why be frustrated by a big vanity fair? Why
pay hundreds for the tickets? Why feel alien at other
people's feast? Why queue for expensive and taste-
less food, why risk ending up at an expensive hotel
because all others are booked months in advance? Why
come back home confused or even disappointed?

We offer you a better option:
Cozy inexpensive software art festival in the heart
of Germany! You won't get lost in the locations but
in the intense program!

Friendly, intimate atmosphere! Meet renown and emerging media artists, people doing strange things with software!

Two unforgettable days of talks, performances, personal communications, get-togethers, and discussions. Thoroughly picked evening program. Free admission. Guidance for student groups. Inexpensive accommodation. Major budget airlines connection. Great local food and beer!

We offer all this and much more at our Readme 100 Software Art Festival! It is a festival run by real enthusiasts; unforgettable experience guaranteed!

Still not sure?

Ok, how about this: Absolute majority of the presented projects will be world premieres! Yes, and no other festival can offer you this. So, hurry up; space is limited. Please reserve your free attendance at og {at} dxlab.org.

Welcome to Dortmund, a high profile city in the North-West of Germany famous for its beer, football team and heavy industry. Today it is also an important center for information technology.

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SPECTRE list for media culture in Deep Europe
Info, archive and help:
http://coredump.buug.de/cgi-in/mailman/listinfo/spectre

The Clean Rooms' Dirty Secret
«Temporary Software Art Factory»:
Readme 100 in Dortmund, Germany, 2005
*Dr. Inke Arns, Francis Hunger*
*(Hartware MedienKunstVerein)*

If we are to believe eyewitness' accounts, the factories of the 19th and 20th centuries used to be dirty, sticky, and, to say the least, unhealthy to work in. With the advent of the 21st century, the end of the industrial age and the advent of the «Information Age», at least in the so-called First World, there are high hopes for a better future. An article published in 2002 in the *Mother Jones Magazine*[1] however shatters these expectations. While the semiconductor industry prides itself on its high-tech 'clean rooms,' a growing number of workers (who in these industries happen to be mostly female) are finding out, according to the magazine, that *«the state-of-the-art protections are meant to safeguard microchips, not humans.»* The significantly increased number of cancer cases in chip production plants seriously puts into question whether the production conditions found here are any better than, e.g., those found in the steel production plants of previous centuries. Today, as the sensory signals (like smoke, fire, heat) are missing in the production process, these new unfavourable production conditions are less immediately accessible to the human senses—and, therefore, potentially more dangerous.

What is being produced by the semiconductor industries provides the material or hardware infrastructure for an increasingly soft-

ware-based environment. It is an environment that is characterised significantly by the performativity of code,[2] by effective program codes that are constantly present in our environment as powerful invisible layers, or rather: by immaterial structures that literally and actively constitute our environment, in a very different way than we know it from built or material structures or architectures. This «augmented space»[3] created by invisible layers transparently covering or constituting the material environment as we know it is a space where «code is law»[4] (Lawrence Lessig). Thus, in this new space moments of «implosions of the political»[5] can be discerned: Where built architectures are merely channelling human behaviour, the ability of ubiquitous program code extends far beyond that. While the «disciplinary societies» as described by Michel Foucault were characterized by built enclosures that Gilles Deleuze compared to «casting moulds», in today's «societies of control» monitoring and modulation have appeared resembling a «self-deforming cast that will continuously change from one moment to the next».[6] This self-deforming cast is characterized by transparency (= invisibility – withdrawing from our immediate sensory perception),[7] immateriality (which is a quasi factual materiality interconnecting single materialities), and performativity («code-is-law»).

By addressing the ubiquitous presence of program code, software art points to the fact that software is an invisible performative layer that increasingly structures our everyday life. Software art, a term that was coined around 1998/99 in the context of net art,[8] has been referred to by some authors as «experimental»[9] and «speculative software»[10] as well as «non-pragmatic» and «non-rational»[11] software. It comprises projects that use program code as their main artistic material or that deal with the cultural understanding of software. Software art thus recalls the fact that programmed architectures are not 'God-given' but have been written/coded by humans and thus can be conceived of also quite differently.

Bringing Readme to Dortmund (and thus for the first time to Germany) was, first of all, a rather spontaneous idea that developed in August 2004 during the 3rd Readme Festival in Aarhus, Denmark. I (Inke) participated for the first time in a Readme conference and stayed afterwards for the three days of the Runme Dorkbot City Camp, jointly organised by Dorkbot London, runme.org, Readme and other institutions. It was, in its mixture of academic conference, hands-on presentations, discussions, exhibitions (in the gallery space rum46), people, performances and hang-outs (the cosy atmosphere of the Academy of Arts Aarhus) one of the most inspiring events I ever experienced. I talked to Olga and Alexei, and invited them and Readme to Dortmund, as guests of the Hartware MedienKunstVerein, whose artistic director I was to become in January 2005.

Now, after actually having worked in Dortmund since the beginning of 2005, it becomes clear that Readme100 in Dortmund was not just a spontaneous idea. What makes Dortmund particularly interesting as a venue for Readme 100 is the fact that the city and the whole region of the Ruhrgebiet is in full transition from a former heavy industrial city (coal, steel) to a city/region focusing on new technologies.[12] Not only is the area of the Phoenix West[13] blast furnace plant, which dates back to the 19th century and was shut down in 2001, particularly emblematic of the structural change now taking place from the age of industry to the age of information (the 110-hectare area, including the 2.200 square meter large PHOENIX Halle,[14] used by the Hartware MedienKunstVerein since 2003, is being developed to provide the infrastructure for the nanotechnology, software and logistic sectors). Beyond that, it is also a particularly poignant example of the effects of globalisation: In the context of China's efforts to meet demand for steel from its booming construction industry, large parts of the coke and steel production facilities owned by

ThyssenKrupp[15] have been sold to China where they have been re-assembled just north of Shanghai.[16] Ironically, as coke and steel are now getting extremely scarce on the world market, the price is rising which in return puts the construction of new coke production plants in the Ruhr region within the realm of the possible.

What we are witnessing on the Phoenix West area thus symbolises precisely the transition from a fordistic / industrial production model to a post-fordistic / post-industrial one. The fordistic production model is represented by, e.g. Hollerith calculating machines, machine processing, «mechanization takes command», batch processing. In fact, the first digital computers were developed as calculation machines that would satisfy the growing need for mathematical calculations for aerodynamics, weapon trajectory tables or population census.[17] The post-fordistic, globalization-related model which started to evolve in the 1970s, is characterised by upcoming concepts of timesharing, offshore outsourcing, borders transparent for capital but not for human resources, the introduction of object oriented programming languages, the increasing networking of computers and the first multimedia computers in the mid-1980s.
The «temporary software art factory» as a concept relates both to the originally fordistic calculating machine, the networked, interactive medium that emerged from it, and globalized modes of production.

Set against the background of these massive ongoing restructurings of modes and places of production, the «Readme 100: Temporary Software Art Factory» call for proposals which was issued in June 2005 called for artistic and theoretical works that would address unconventional and experimental ways of software art production, including self-employing, hiring, using open source solutions, interfacing with the IT economy sector and educational/cultural institutions, and especially the practice of

outsourcing. We were interested in how people would address «the clean rooms' dirty secret» (i.e., software productions conditions in the context of a globalized industry). The international jury selected ten new artistic projects from over hundred submissions and supported these projects (five new artistic works, five new theoretical articles) with production grants. The artists and authors of the selected projects come from Argentina, Australia, Germany, Great Britain, France, Italy, Russia, Switzerland and Spain. The selected projects were premiered during the Readme 100 festival in the City and State Library Dortmund (and they will consecutively be presented at transmediale.06 in Berlin in February 2006). On the closing night in Künstlerhaus Dortmund an abundant series of performances based on self-written software took place and DJs played electronic music until dawn. The detailed program can be found at http://readme.runme.org.

1    http://www.motherjones.com/news/feature/2002/03/clean_room.html

2    Cp. Inke Arns: *Read_me, run_me, execute_me. Code as Executable Text: Software Art and its Focus on Program Code as Performative Text*, in: Rudolf Frieling / Dieter Daniels (eds.), *Medien Kunst Netz 2: Thematische Schwerpunkte*, Springer Wien/New York 2005, pp. 197-207, http://www.medienkunstnetz.de/themes/generative-tools/ read_me/textsummary/

3    The term «augmented space» was developed in 2002 by Lev Manovich. See his *Poetics of Augmented Space*, in: Inke Arns / HMKV (eds.): *Dispersed Moments of Concentration. Urban and Digital Spaces* , Frankfurt/Main: Revolver, 2005, pp. 102-121

4    Lawrence Lessig: *Code and other Laws of Cyberspace*, New York 1999, http://www.code-is-law.org/

5    Cp. Inke Arns: *Invisibility and Politics. On Spaces of the Political beyond the Visible*, in: Inke Arns, Ute Vorkoeper, HMKV (eds.): *vom Verschwinden. Weltverluste und Weltfluchten / On Disappearance. Loss of World and Escaping from the World*, Frankfurt/Main: Revolver — Archiv für aktuelle Kunst, 2005, http://www.projects.v2.nl/~arns/Texts/Media/Arns-Invisibility-05-EN.pdf

6    Gilles Deleuze: *Postscript on the Societies of Control*, in: *L'autre journal*, Nr. 1, May 1990

7    Cp. http://en.wikipedia.org/wiki/Transparency_%28computing%29

8    The term «software art» was first used around 1998 when referring, for example, to I/O/D's *Webstalker* project (1997). In their project *Introduction to net.art (1994–1999)* (1999, http://easylife.org/netart) Alexei Shulgin and Natalie Bookchin explicitly point to «software art» as to one subgenre of net.art and one of its future directions of development. In 2001, transmediale (Berlin) was the first festival to introduce the category of «artistic software»or «software art» into its competition.

9    Tilman Baumgärtel, *Experimentelle Software. Mysteriöse Korrespondenzen: Zu einigen neueren Computerprogrammen von Künstlern*, in: *Telepolis*, Oct. 28, 2001, http://www.heise.de/tp/r4/artikel/9/9908/1.html

10   Matthew Fuller, for example, distinguishes between 'critical', 'social', and 'speculative software'. See Matthew Fuller, *Behind the Blip: Software as Culture*, in: *Nettime*, Jan. 7, 2002, http://amsterdam.nettime.org/Lists-Archives/nettime-l-0201/msg00025.html

11   Olga Goriunova and Alexei Shulgin define 'artistic software' as 'unpragmatic' and 'irrational': «*[If] conventional programmes are instruments serving purely pragmatic purposes, the result of the work of artistic programmes often finds itself outside of the pragmatic and the rational.*» (Olga Goriunova / Alexei Shulgin, *Artistic Software for Dummies and,*

*by the way, Thoughts About the New World Order*, in: Nettime, May 26, 2002, http://amsterdam.nettime.org/Lists-Archives/nettime-l-0205/msg00169.html

12   Due to the closing of the coal mines and the steel factories Dortmund currently has 18% unemployment.

13   See the amazing photo documentation on http://hebig.org/playground/facetbrowser/?do=showpostings&facet=company&value=phw

14   PHOENIX Halle is a three-nave industrial hall built on the grounds of the blast furnace plant in Dortmund-Hörde in 1895 as a spare storage warehouse. Here, the exhibition *Games — Computer Games by Artists* (2003) took place—which received the «Innovationspreis» by Fonds Soziokultur and an award of distinction of the German section of AICA—as well as the exhibitions *so wie die dinge liegen*, *Nam June Paik Award* (both 2004), *Dispersed Moments of Concentration. Urban and Digital Spaces* and *On Disappearance. Loss of World and Escaping from the World* (both 2005).

15   For more information on ThyssenKrupp's activities in Dortmund and China cp. Ray Hudson: *Changing Industrial Production Systems and Regional Development in the New Europe*, Working Paper 45/02, http://www.one-europe.ac.uk/pdf/w45hudson.pdf

16   Patrick Bartlett: *German steel works finds Chinese home*, *BBC News*, 2 September, 2002, http://news.bbc.co.uk/1/hi/world/asia-pacific/2231403.stm

17   See on this, for example, Edwin Black, *IBM and the Holocaust: The Strategic Alliance Between Nazi Germany and Americas Most Powerful Corporation,* Crown Publishers 2001, http://www.ibmandtheholocaust.com

*Olga Goriunova, Alexei Shulgin (Readme)*

Readme 100 is the fourth edition of the software art festival
that was conceived in Moscow in autumn 2001. Through these
years Readme has worked out a set of distinctive characteristics.
The festival travels each year to the new city and even country; it
changes the format experimenting with different forms of organ-
ization of such elements of the art production chain as final pro-
duction, presentation, distribution and reception.

Experimental character of Readme has both advantages and disad-
vantages. An advantage for us, traveling curators, is more freedom
from any particular local cultural myth, funding body or other
defining element, which allowed Readme to try out new forms
of working with artists and audiences and to generally achieve a
different level of flexibility. The other side of the same coin is the
precariousness of Readme practice and politics, and we perceive
such limitation as the price to pay for free experimental produc-
tion in the form of an art event. Joint work of Readme and local
organizers, who often do one of the hardest parts of the work and
take risks, willing to support Readme ideology, yields, as we hope
and will demonstrate below, fruitful results. Let us turn for the
moment to the history of Readmes.

In May 2002 the first festival entirely devoted to software art took
place in Moscow. Was the first Readme a bit of «aventure»?
Surely. Dealing with vague software art rendered problematic

even formulation of the call for submissions, not mentioning the impossibility to estimate the number and quality of entries.

Second Readme in Helsinki 2003 turned the festival into a traveling event. Temporary moving to Finland ourselves, we brought along the idea of organizing the next Readme in that futuristic and open towards new media culture country. Readme 2003 as well as the previous Moscow edition more or less followed the traditional festival model: invited leaders of the scene and associated spheres came to present their work. There was also a small exhibition framing the event.

The major event of Readme 2003 was software art repository Runme.org that has developed from a submission form introduced by Readme 2002 by the core team of authors of this text, Amy Alexander and Alex McLean as well as a larger group of contributors.[1] Runme has become a unique platform for software art, with specific mechanisms for the practices' classification, contextualization, distinction and other.[2] From 2003 Runme.org leads an independent life, benefiting from the Readmes, but not being directly connected or dependent on either of them.

Readme 2004 was held in Aarhus, Denmark as a result of a joint effort of Digital Aesthetics Research Center of University of Aarhus, Jutland Academy of Fine Arts and Dorkbot as well as many other hosting and supporting institutions. The 5 days festival gathered more then 70 participants taking part in two-part event consisting of a conference and a city camp. A conference has aimed at bringing together research done in software art over previous years and stimulating new directions of its development. Readme Software Art and Cultures Edition 2004 has become the first theoretical publication on software art. Runme Dorkbot city camp turned out to be a unique victorious experiment in interfacing artists to audiences and other artists and practices. At the city camp everybody had to present from 5 to 20

minutes (flow moderated by unique robot software, courtesy of Dorkbot), thus breaking the distance between presenters and audience. The atmosphere of exchange, mutual work was also created by spaces where people could discuss while listening to the endless broadcast of presentations, by lounge with sofas and tea, and by various mutual activities, such as participating in the intense evening programs, visiting exhibition, attending work-shops and having meals together. The emphasis on not present-ing «stars», but introducing a large amount of people working in the same sphere, creating warm atmosphere of mutual support and stimulation worked out well.

Readme 2005, invited by Hartware MedienKunstVerein, has traveled to Dortmund, acquiring a name Readme 100 temporary software art factory.[3] A new format chosen for the event implied Readme turning into temporary factory producing software art.

Dortmund edition has become a «factory» focusing on production. Different ways of software art production, including self-employing, hiring, using open source solutions, interfacing with IT economy sector and educational/cultural institutions were called to be researched in the framework of the event.

Practically Readme 100 decided to support production of 10 projects (both critical texts and artistic works). An open call for ideas was issued, and the jury (consisting of organizers – Inke Arns, Francis Hunger and authors of this text, and Amy Alexander and Alex McLean) was to choose the ideas that suited best both the quality criteria and the year's theme. The authors of selected works were funded to implement their ideas and present the resulting projects at the face-to-face meeting in Dortmund, 4–5 of November 2005. Thus, all the works presented were first premiered at the festival, which was a risky situation for an art event since the quality of final works and, consequently, the resulting event was hard to forecast.

The process of selecting among the submitted ideas was not easy. Besides the usual concerns, the jury had to take into account the

project's feasibility in the given time frames as well as the funds needed to implement the project. But we believe that the selected ideas work well from the point of view of correspondence between an idea and its implementation, as the ability of the work to transmit the author's message is one of the most important issues when selection is based just on a text description of the idea and the result is coming later.

Production of art is an interesting and diverse topic. Here ideological concerns get intertwined with visual thinking, technical skills demands, inspiration and economic conditions in an intricate manner. In case of software art it is even more of a challenge: software art pieces are often produced using conventional software production models, sometimes pragmatic software tools get regarded in terms of software art and vice versa—software art projects get used and sold as tools. Logic of artistic experimental production get mixed with the one of software industry, open source community and even with such an outcome of globalization and neo-liberalism as outsourcing. Outsourcing represents a difficult ethical issue. Artists sometimes use outsourcing, and, thus, it becomes part of the art production chain. Readme 100 has engaged in thinking on outsourcing as one of the already existing production models.

The present publication unites texts produced in the framework of software art factory and reports on the implemented projects. Jury's comments introduce the projects. Each piece of work presented here refers to current problems and themes, suggesting a unique response of its own.

«The Invisible Hand» by Renate Wieser and Julian Rohrhuber is an ironical reflection on data transformation: taking mathematical model of the market, it generates music that, in turn, generates image. Connecting completely different realms, Wieser and Rohrhuber critically comment on the mechanism of creation of much of today's media art. «Cosmolalia» by Christophe

Bruno focuses on unsellable, unmappable and unscientific, proposing a strategy to evoke, create and keep them beyond market and irony.

Alessandro Ludovico with his paper «Spam! The Economy of Desire» reflects on the history of spam, a hot topic in digital culture research and an annoying reality of everyday life. Mitchell Whitelaw's «System Stories and Model Worlds—A Critical Approach to Generative Art» is devoted to the dichotomy: software art (software culturalism) – generative art (software formalism) and proposes to bridge the gap between them by building «critical generativity».

Ilia Malinovsky comes from computer science background, and his project «LYCAY—Let Your Code plAY» represent a programmers' need for radically different tools with not just rational, but also emotional and aesthetical modes of interaction. «Towards a Permanently Temporary Software Art Factory (Notes for the Sustainability of Software Artifacts)» by Javier Candeira – is a potentially successful attempt to marry art and open source production practices. The two realms have very different grounds and logics, but Javier is aiming at bringing them together.

«MapOMatix» by Yves Degoyon, elpueblodichina, Sergio Moreno, Jaume Nualart and others contributes to psychogeography,— a theme that has been very hot recently. This project introduces a number of interesting features such as mapping of non-geographical, virtual spaces, and time layers, thus, dramatically broadening its possible use.

«aPpRoPiRaTe!» by Sven Konig uses features of video-compressing algorithms to create 'new visuality'. The project works best with DVD rip-offs, largely available on the Internet.

Two projects are devoted to exploring the models of economic support of the artist and their «price». «Reject me» by Special Guest comments on European welfare state model. Suggesting «state scrounging as means of production» of art works, this anonymous

artist presents a scheme that could be seen as amoral or danger-
ous. The work invites to discuss this widely practiced model.
«Outsource Me!» by Leonardo Solaas creatively subverts the idea
of the festival and offers a new way of software art production:
reverse outsourcing. Parodying usual working conditions of an
outsourced programmer he asks for ideas as if he would not have
them himself, demanding that potential «employers» would
apply with tasks that would fit his skills and make him interested.
The winning idea of the «Outsource Me!» contest selected and
implemented by Solaas is «Go Logo» by Eric Londaits.

1   Florian Cramer, Matthew Fuller, Thomax Kaulmann, Pit Schultz, and The Yes Men.
2   We have written on Runme.org in Goriunova O., Shulgin A., *Read_me 2.3 Report* in:
    *Read_me 2.3 Reader*, NIFCA publication 25, 2003 (also available here: http://www.m-
    cult.org/read_me/report.htm); in Goriunova O., Shulgin A., *From Art on Networks to
    Art on Platforms (Case studies: Runme.org, Micromusic.net and Udaff.com)* in:
    *Data browser volume 3: Curating Immateriality: On 'the Work of the Curator in the Age of
    Network Systems'*, ed. Joasia Krysa, Autonomedia, New York, 2006 (forthcoming).
3   4 equals 100 in the binary numeral system and we use this system to name the fourth
    edition of the event for the reason of beauty of the title.

**P R O J E C T S**

*Now we have all welcomed email into our lives en mass, we find our inboxes swamped with unwelcome spam, tempting our worst instincts with every kind of sleaze, urging in ever more obscure ways that we buy counterfeit watches, printer toner and erection pills. We should welcome Alessandro Ludovico's paper «Spam, the economy of desire» then, and face the fear and pain of spam together.*

*Alessandro Ludovico's account on spam is an encompassing inquiry into the history of spam. He talks on the first spam ever, on the history of the term «spam» and its first usage, on the neverending fight between spammers and spam filters and the attention economy that results. He mentions academic and journalistic research in spam and references the publications available, going on to suggest a general classification of spam and analysis of its aims and results.*

*Spam is not just annoying: it can harm the working process severely, it can make people change their mail addresses, losing connections within social networks. To someone behind a public email address, spam grows to a constant, hour-by-hour exposure to the worst aspects of human nature, where spams appealing to worst forms of vanity, greed and perversion make us doubt the culture to which we belong and perhaps even ourselves. But even someone driven this crazy by spam occasionally pauses to be amused by some new ironical twist or new means of attracting attention.*

*This is the beginning of an interest in the phenomenon and development of spam and we will undoubtedly see more research in spam in the following years.*

*Alessandro is the continuous editor of Neural.it for already about 10 years. One could see this huge work reflected in the essay even in the way some references are done: Ludovico has already written on this and that in Neural.it before. One knows how much of «this» and «that» happens in the field of digital media culture and never stops being surprised at Alessandro's capacities and enormous working potential to cover almost entirely everything.*

<div align="right">Olga Goriunova, Alex McLean</div>

## Introduction

Spam, as one of the inescapable communication phenomena of our times, is a lively part of our everyday infoscape. Spam is extremely pervasive and effective for billions of persons whose (easy to spot and trade) personal and open communication door is constituted by few letters/numbers, an @ and some dots. With various final aims, from the fascinating advertisement of miraculous products to the so-called 'phishing', or tricking people into disclosing personal information for nefarious purposes, the spam entrepreneur knows almost perfectly how to verbally titillate his target. So spam isn't not only about abusing a common (the smtp and pop3 protocols), and not only about technically surviving the frequent providers' cuts of services, but mainly about continuously reinventing the concise language of good's charm. And the endless literary war between software spam-filters and spammers will probably never have a winner. It'll be played using different code/sign combinations to trick new filters and go through the verbal protection/censorship. With a constant retina overload, few tactical (key)words can make the difference.

## Attention Economy

> *«A vast sector of modern advertising… does not appeal to reason but to emotion; like any other kind of hypnoid suggestion, it tries to impress its objects emotionally and then make them submit intellectually»* (quote attributed to Erich Fromm).[1]

The economy of attention, in an almost completely mediated public environment and landscape, requires something to emerge from the unbearable amount of signals we have to face. Spam on one hand pollutes our email personal environment and on the other hand is able to sometime emerge from its own grayness and capture our eyeballs. Even if in the jungle of trash communication, genuine personal messages become golden signals, the total amount of communication delivered by spam forces us to navigate in the most crowded words environment, searching for sense. This has to be coupled with the general sensible reduction of 'spare time' or 'free time' that again enhances personal communication. Thus being 'personal' a spammer could use words and tones usually forbidden in public, so he can easily be curse, or explicit, or too confidential. Everything happens between two windows on the respective screens. The spammer's remote one, containing the bulk mail software in action and the local one of the spammed individual. So when commercial, or business communication almost physically enter the personal space, everything seems to be allowed. And the borders of this type of communication seem to be very subtle reaching unexpected limits in tone and words. Spam embodies the main paradox of the net: guaranteeing freedom of electronic communication could mean too much and too diverse communication one single targeted conscience can tolerate. The process of targeting the individual was massively applied at the end of seventies through the direct marketing practices, and it'd not be a coincidence that in the same period the first word processors software with 'merge' capa-

bilities from database of addresses were released. Actually I've received the first 'bulk mail' in the middle eighties, at age of 15, and this heavily 'customized' letters were establishing for the first time a different relationship, not anymore anonymous. If you think these concepts are of late seventies, think twice, because the DMA, Direct Marketing Association was founded in the United States in 1917.[2] What the postal direct marketing announced was the personal space invasion. Spam seems to be the final test for the conquest of our neuronal space. John Thackara, the director of the *'Doors of Perception'* conference and knowledge network, said that: *«Our dilemma is not that we receive too much information. We don't receive anywhere near the quantity of data it takes to over-load our neurons; our minds are capable of processing and analyzing many gigabits of data per second–a lot more data than any of today's supercomputers can process and act on in real time. We feel flooded because we're getting information unfiltered, unsorted, and unframed. We lack ways to select what's important.»*[3] In fact, we're not yet trained to avoid unwanted information. In a textual environment we are still overcome by our primary instinct of being attracted by signs and so by words. And the spammer strategies are very focused on attracting attention. The use of capital letters, the «Re:» as reply, putting your email, or elusive names of man / women, in the 'From:' field are only few of the tricks successfully adopted in years. And let's not forget that composing an effective subject is more than half of a spammer's work. The subject field in the spam email is the place where the battle for the user's attention takes place. It's a matter of a second or a little more to see who won and who lost. It's much faster than the advertisement on print, radio, and TV that used to be the fastest of all. So spamming, in a way, has completely digested the broadcasting and billboard advertisement culture, and as in its physical equivalent (the wood or metal mail box) you have to remove unwanted

stuff by hand, and chances are that some of the stuff will defini-
tively attract your eyes. To avoid this addiction there should be
strategies or products. A fake, but an ingenious one, is included
in one of the latest projects by Alexei Shulgin. The *'SeeFree Visual
Spam Blocking System'*[4] is advertised as a pair of glasses that can
generate an 'augmented reality' vision darkening the billboards
and the rest of public advertisements. It's interesting to note that
the reality proposed is 'augmented' in terms of the ecology of the
mind, but it contains, at the same time, much less information.
I would also suggest that it'd be great if a new version of this imag-
inary device would also automatically darkening the email spam
subjects on the screen freeing our eyes from always reading them.

## History

The concept of unsolicited commercial proposal or advertise-
ment delivered to your own door probably dates back to the first
traveling salesmen at the end of the 19th century. At that time
salesmen toured the countryside trying to sell their goods directly
to the doors of their potential customers, without any previous
appointment. But probably the first type of 'mediated' unsolicit-
ed advertisement delivered at home through physical mail is the
printed one, and then the so-called telemarketing, sales proposals
made through the telephone, both still widely used today. The
first evolution to these two strategies was, at the end of eighties,
that many advertisements were arbitrary sent by fax, still causing
harsh reactions for the huge amount of wasted valuable thermal
paper involved.[5] Today this practice has been renamed as 'spam
fax'. The sending of non-solicited emails dates back to the 1st
may of 1978,[6] when the marketing department of DEC, the
famous computer manufacturer, invited his users to assist to the
DECSYSTEM-20 new models' presentation in Los Angeles and
San Mateo. The message was sent to all the west coast's Arpanet

users even if the used software had limited space for the recipient fields. To overcome this limit, all the recipients were typed one by one (and some addresses were even added in the subject and in the body of the text, and that now can be read as an obscure presentiment). The mail caused bitter reactions, of course, and it's curious to note that Richard Stallman that was one of the recipients expressed a different opinion. At the beginning he defended the sender in the name of freedom of expression and then he realized that it was bad, but only, he said, because of the mail header that was too long, not for the contents. The word 'spam', that derives from the infamous canned meat's firm, was used in the eighties in the BBS and chat communities as a repetitive visual / sounding noise for driving out unwelcome guests. The word was used to describe an unsolicited mail for the first time on March 31 1993 by Joel Furr.[7] He defined the act of sending recursive message onto the news.admin.policy newsgroup (caused by a software error) as 'to spam'. He was clearly referring to a popular



# FAX.ONE

Campaign Against Junk Fax Companies

Please help us confirm whether you wish to receive fax advertisements

We are under the impression that you no longer wish to receive fax advertisements. If this is the case, please confirm your fax number so we can inform all the major fax marketing companies that you no longer wish to receive fax advertisements.

Fax number:

Yes, this is my fax number and I DO NOT wish to receive anymore fax advertisements (please tick box)

No, this is not my fax number. My fax number is

To confirm you no longer wish to receive fax advertisements, please fax back to:
0906 

If you do not mind receiving further fax advertisements please do not reply
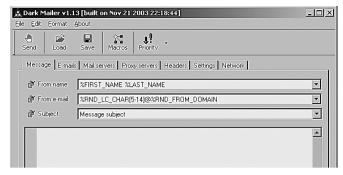
Monty Python sketch, first broadcasted in December 15, 1970, and then often re-broadcasted on the BBC.

It was the final sketch of the 25th show of Monty Python's Flying Circus, and it was very popular among computer enthusiasts. In the sketch a couple of customers are trying to order a breakfast without SPAM, the meat, from a menu that includes spam on everything in it. The sketch is irresistible and the word «Spam» is mentioned 94 times. A little less than one year later of the historic definition by Joel Furr, (on March 5, 1994) the first massive and in a way 'official' spread of spam was initiated by the infamous couple of lawyers Laurence Canter and Martha Siegel. They used bulk Usenet posting to advertise US immigration law services, and they never regret, stating that *«(we) don't see anything more wrong with that than advertising in a newspaper or on television on a topic not directly related to the article or the show you're reading».* [8] Then from 1995 to 1997 the Floodgate Bulk Email Loader becomes the most used software tool for spamming. From then on spam has been grown exponentially till now with the support of software tool for sending millions of emails in hours. The Floodgate software is there no more, but it generated many successors as the current Dark Mailer that basically



Monty Python's Flying Circus. 25th show. Spam. 1970

exploits proxies or mail servers that can send emails from strangers, the so-called 'open relay servers'.

### Mass Intimacy: The language of desire (sell)

But the first question about spam may be: why sending so much annoying email to the world? The answer is simple: to make money. Lots of. The second question is how make that money? Obtaining percentages on every online subscription, or sale bought after a referred online contact. As we can see in the table compiled by a professional spammer, even with the percentage of one sell every 10.000 mails, the revenues can be at least attracting, taking in count that one million emails can be sent in a couple of hours, and that no further action then is required.[9] So the (sad) truth is that sending millions of pornography spam mails induce a few hundred persons to subscribe to porn online services and sending millions of 'penis enlargement' pills spam induce a few hundred persons to buy them. But what is the mechanism that lies behind the success in generating subscriptions and sell? First, the good old marketing techniques. As any experienced spammer would recommend: the more focused the email (target) list you have the more money you got back. And spam embodies a very different level compared to billboard, paper, radio and TV

advertisement: the intimacy. Its own style is based on this 'confidential' tone, mimicking the one we are used to, in personal email. So this 'intimacy' style (even if massively applied) has to strike a chord in the user subconscious. Every possible strategy will be used, focusing on the most effective ones. So the resulting spam scenario is one of 'mass intimacy' that amuses heavily using 'personal insecurities'.[10] The user, in fact, has to feel the sensation of being involved in a 'special kind' of communication, basically a personal one. Paradoxically enough, spam itself caused this inner 'natural selection' generating the lack of personal feeling, burying personal communication with huge amounts of commercial offers. Some basic marketing principles (being attractive, direct and personal) are pushed to the extreme in spam. The same product (viagra, for example) actually is advertised by way too many people in the same 'direct' style. Thus, to be effective, spammers have to tell their stories evolving their own communication strategies. So spam is, as one of its infamous subjects, «Strictly Confidential». Spam never wants to scream to the masses, but to 'infiltrate' our cultural and social filters and pose as a friend that is suggesting tips and tricks to improve our existence. It learned a lot from the viral marketing techniques that are based on the exploitation of personal relationships' trust. Spam acts as an updated survey of the most basic desire and taboos incarnations (having sex with unknown people, owning status symbol objects, owning more money, being more healthy). It deals with some of the most common contemporary men's social weakness, and the mirage of obtaining them quickly and without a big effort. Therefore spam seems to be mainly for men, because it relates to the quick and dirty power acquisition. For example one of the (admitted) current pharmaceutical marketing strategy is persuading us that we are all sick and that effectively translates into effective healthy based spam strategies.

A very basic taxonomy of spam sent for generate sells is:

— status symbol objects (Rolex, Cartier...)
— stuff that promises to overcome physical limits (pain, penis dimension, fat, ...)
— expensive stuff for cheap (OEM software)

The transition from mass marketing, to direct marketing, to spam marketing enables a deeper and more intimate communication. The attractive typical spam 'unofficial' proposal is a part of the 'word-of-mouth' style. And when this 'word of mouth' template is applied the user is induced to feel as being part of a restricted lucky elite, usually 'by chance'. This concept is very well implemented in the '*Toll-Free Number*' work [11] developed by the Italian net artist Luca Bertini. It consisted of an action of a teasing campaign made by a sensual female synthetic voice, announcing a new mysterious product that will be launched soon. The product is never disclosed, but the automatic voice call, without previous notice, a huge amount of people, persuading them to call back the toll-free-number (tracing the personal phone numbers). Then a password to a non-existent 'reserved area' is given in exchange of the personal email. In this way the user's private email is obtained and then sadistically spammed. So spam is not selling controversial goods, and not selling access to fabulous online services. I think spam is just selling dreams.

### Deceiving: The language of deception (phishing)

If email direct marketing is the semi-legal part of spam, the so-called 'phishing' is the dark one. Phishing is a form of social engineering, characterized by attempts to fraudulently acquire money or sensitive information such as passwords, masquerading as a trustworthy person or business. [12] The scam emails are usually very carefully written, and they sometimes got what they want: the trust of the deceived person. In fact, as the famous hacker

Kevin Mitnick says in his book '*The Art of Deception*': «*trust is the key to deception*».[13] It's a (dangerous) communication game, and it's all about the used codes. It's quite similar to circulating counterfeit banknotes, or making fake passes for entering restricted areas. It's not so much about the original reproduction accuracy. It's mainly about the pose and voice tone used during the scam. In the email grammar this can be translated in the subject and body text style. So mimicking the official tones, with all the usual conventions, or the confidential one including national prejudices, myths and rumors can lead to making people loose variable amount of money as a result of trust in some email messages. Many of the used techniques have a long history. The 'Hot Stock' Spam, for example, pretend to hint a share that will increase its value a lot in a few days. The scheme is simple: the scammer has bought some shares, and after his spam, many have bought it too, making the price rise. At this very point the scammer sells all his shares, catching the rise, while the share starts to fall due to the sudden lack of buying requests. There's even a study made on almost 40 spammed stocks (called Spam Stock Tracker[14]), which tracked them in the spam's subsequent days, demonstrating how much money one could have lost. Suggesting good stocks to buy in an 'illegal' way is not a new concept at all. In 1840 the stock exchange prices in London were transmitted to Edinburgh through the telegraph in code. An unscrupulous London's broker tried to get hold of this valuable information corrupting two telegraph clerks, but then failing to pay them the promised half of the scammed money. He was then exposed to the authorities.[15] The scam focus is to evocate a daydream, dream of being rich or sexually irresistible, or being admired for wearing an expensive clock. Most of scams are clearly based on a fairy tale's logic, indeed. They induce the need of sudden revenge against a grey life. But this is also a common theme of the much more involving

TV or billboard advertisement, so what's the attraction of an email scam? I think it lays mainly in the 'tongue in cheek' style, that lights up the desire of a 'once in a life' opportunity. If you want, this is the old 'American Dream' rhetoric: changing your own life in a few. And in the network era nobody is stuck on his physical place. The opportunities can come out from everywhere through the network, so the Internet cornucopia can bring that long awaited chance.

A very basic taxonomy of spam sent for phishing seems to be based on two main concept: fear and fortune.

Fear (technology gone wrong):

—Account Verification (Ebay, PayPal, bank accounts)

—Account Violation (same as above)

—Account Disabilitation (same as above)

—Changed password

Fortune (unexpected money, becoming rich overnight):

—Hot Stocks

—Congratulations! (lottery winning)

—Mistaken identity for big inheritance

—Request to transit huge amount of money for a percentage *«A spammer's main objective when sending spam is to impersonate someone else. A spammer never wants to reveal his identity»,* — Spammer-X.[16]

One of the most famous scam, the so called Nigeria-scam, was the stage for a theatrical performance played by the renowned English actors Dean Cameron and Victor Isaac, titled *'Urgent & Confidential, Dean Cameron's Nigerian spam scam'*.[17] After assuming the identity of a sexually confused Florida millionaire, whose only companions were his houseboy and cats, he began a nine-month correspondence with the scammer. The show documents the real email and letter exchange, including fake documents and photographs sent as a proof by the scammer, becoming hilarious and theatrically descending into misunderstanding, desperation and deception. A similar approach is taken in *'The Spam Letters'* book, written by Jonathan Land, an active external collaborator of the Negativland group.

He gathers some of the written 'replies' he sent to spammers masquerading as a multitude of characters that most of the time, are written in an absurd, sometimes hysterical, but always exhilarating style.[18] Here the scam technique is turned back to its initiators and the collection of literary performances represents a somewhat multifaceted 'virtual revenge' for the readers/users, that finally can see some spammers verbally got down on their knees.

### Private marketing will trigger the next language war

This need for revenge is largely shared among the frustrated users and this has lead not only to many Anti-Spam groups and public resources (as the *Spamhaus* project — one of the first serious blacklist of spammer vendors,[19] or the useful *SpamArchive*,[20] a community resource that provides a database of known spam to be used for testing, developing, and benchmarking anti-spam tools) but also to some interesting conceptual development. One

of the (tested) strategies, even if quite radical, was the one written as a scientific paper by Aviel D. Rubin, Simon Byers and David Kormann, called *'Defending Against a Internet-based Attack on the Physical World'*.[21] It describes a fairly simple software, written by this team, which can be used to subscribe the spammer victim to a huge quantity of advertising catalogs through their websites, flooding him/her of unwanted paper. The program automates a real case happened to Alan Ralsky, also known as 'spam king' who, after bragging on the Boston Globe about the money he made sending hundreds of millions of unsolicited commercial emails, saw his real-life mailbox clogged by tons of advertising papers after his interview was reported on Slashdot. A similar concept (connecting the production of spam to something physically produced) was expressed in 1998 by the american artist Nick Philip, in his *'Nowhere.com'* installation.[22] Nowhere.com was a fake internet domain that appears at that time as a return address of spam. At the Tokyo's Intercommunications Center he connected all the email directed to the domain to a series of fax machines, and produced a 17 kilometers of thermal paper wasted in some trash-cans. The materialization of spam means to keep it out of the screen. The *Spam Shirt* initiative,[23] is the reuse of spam as a 'real' object. The website offers the possibility of buying a customizable T-shirt with the spam subject of choice, and it's commercially successful. Somehow the act of wearing publicly a spam is a way for exorcizing his omnipresence, also decontextualising it from the email frame. Another simple way of seeing spam out of the mail software is *'Today's Spam'*,[24] a blog whose posts are only spam messages. Reading the blog it feels like being in a wrong place, and out of one's own mailbox, as if all the junk mail has been definitively confined to an 'external' blog. But changing the context would mean also to change the referring medium, so *Spamradio*,[25] a continuous streaming of text-to-speech spam, with a hypnotic

musical background, is changing the visual in acoustic noise, mutating its nature and, at the same time rendering it as a pop artifact. The language of the «epistulae non grata», [26] as they are defined in Latin by Danny Goodman, the author of the *Spam Wars* book, is a constantly mutating one. One proof is that even the group of the mailing list moderators' that established a 'spam critic' nickname in spring 2003 (nettime's_spam_kr!k!t), digging in the amount of spam that the list receives, periodically extracts the one with political or social cliché, or shows the amazing results of merging the list name in pre-written templates. The life of spam is intertwined with the anti-spam filter escaping. But escaping automatic language filters is a very old and fascinating activity played from the telegraph era till the Napster's first restrictions based on a database of filenames. Actually the best (but far from perfect) spam filters are based on the bayesan approach, [27] a statistical filtering that applies the Thomas Bayes theorem to quantifying uncertainty. This 'uncertainty' is strictly connected to the words and phrases composition, and the data cloud of these very words can be observed in the online work '*uninvited words*' by Päivi Hintsanen[28] in a sequential classification that reveals the recurrence of terms and at the same time the unsuspected richness of used language. In the end openness requires to deal with extremes. You can (partially) filter spam, but probably you'll never definitively stop it or get used to it. Spam is open access reverse engineered, and ready to become the test bed for the next generation of marketing. If Erich Fromm was right, one of the basic human needs is to feel new emotions, and spam is full of (fake of) them. So, bringing (virtual) hope, desire and happiness, spam'd be an excellent model for some of the near future mass media communication. And if invasive advertisement is going to slowly become the norm, we'll probably adapt to it through our own language skills, in order to avoid it (at any level) or indulge on it, now or in its future more subtle and sophisticated incarnations.

1   http://en.wikiquote.org/wiki/Erich_Fromm

2   http://www.the-dma.org/

3   http://mitpress.mit.edu/e-
    books/mediawork/titles/shaping/shaping_webtake/index.html

4   http://www.neural.it/nnews/seefree.htm

5   http://www.nik.co.uk/weblog/archives/001668.php

6   http://www.neural.it/nnews/1978spam.htm

7   http://groups.google.com/group/alt.folklore.computers/browse_thread/
    thread/3f760db408bb109c/dc98a1f9c6a59477?tvc=2&hl=en#dc98a1f9c6a59477

8   Internet and Comms Today, Issue 6, April 1995, p.31

9   Spammer-X, *Inside the SPAM Cartel,* Syngress Media, 2004, p. 131

10  Ibid, p. 98

11  http://ilnumeroverde.net/

12   http://en.wikipedia.org/wiki/Phishing

13  Kevin D. Mitnick, William L. Simon, *The Art of Deception*, Wiley, p. 41

14  http://www.spamstocktracker.com/

15  Tom Standage, *The Victorian Internet, Phoenix mass market*, 1999, p. 103

16  Spammer-X, *Inside the SPAM Cartel…*, p.64

17  http://www.spamscamscam.com/index.php

18  Jonathan Land, *'The Spam Letters',* No Starch Press, 2004

19  Brian S. McWilliams, *'Spam Kings: The Real Story behind the High-Rolling
    Hucksters Pushing Porn, Pills, and %@)# Enlargements',* O'Reilly, 2004

20  http://www.spamarchive.org

21  http://www.neural.it/nnews/attaccarespammercartae.htm

22  http://nphilip.best.vwh.net/instal.htm

23  http://www.neural.it/nnews/spamshirt.htm

24  http://spamtoday.blogspot.com/

25  http://www.neural.it/nnews/spamradio.htm

26  Danny Goodman, *'Spam Wars: Our Last Best Chance to Defeat Spammers,
    Scammers & Hackers',* Select Books

27  Jonathan A. Zdziarski , *'Ending Spam: Bayesian Content Filtering and the Art
    of Statistical Language Classification',* No Starch Press, 2005

28  http://www.coloria.net/dig.art/uninvited/words.htm

## Cosmolalia
### Christophe Bruno

*Christophe Bruno's paper is a description of an artistic project. It is itself an artistic work performed by an ex-physicist and ex-mathematician who developed quite a few well-received art projects very soon after he left his scientific career. Bruno also has a strong interest in language, one of the most mysterious of human's capacities (products?), and in culture as it is fused with markets. The ideas Bruno puts forward in the present piece of writing have been bothering many and have been researched by well-known philosophers, political theorists or economists; however, he suggests his own way of interpreting and struggling with the reality of today.*

The «present day» might be remembered in the future as a time when science and «unscience» — religion, myth, language, and the otherwise unquantifiable — both pushed forward with intense fervor, often made to work awkwardly in tandem despite their inherent contradictions. Religions, disguised as countries, continued to go to war with one another as they'd done for thousands of years — possibly millions, depending on whether one subscribed to a scientific or unscientific viewpoint. And a particularly controversial yet powerful group of unscientists argued that while it was impossible to scientifically determine that the temperature of the earth was increasing, it was on the other hand possible to use a scientific mapping of market trends to predict when their enemies would attack. Markets, it seemed, held a special, elevated status,

*one that was somehow outside of and immune to the limitations of both science and unscience, yet in harmony with both.*

*Christophe Bruno's «Cosmolalia» begins at this complicated place, where science, maps, and markets collide with the the unscientific, the unmappable, the unsellable — and tries to create a place where the latter group can be safe. He does so by proposing a strategy for creating maps only an individual human could create — maps of connections between religion, myth, language, and the otherwise unquantifiable. Bruno is considering eventually developing Cosmolalia into a software–based system. Given that science already claims to have unlocked many of the mysteries of human perception in «unscientific» domains like art and language, as well as the secrets to human mapmaking (Pescovitz\*), one wonders whether Cosmolalia could, despite Bruno's best efforts, wind up a marketable product after all? The answer may lie not in the lack of tangibility of some of the data Bruno maps (myths, memory, etc.) but in the individuality of the human thought «algorithm.» Whether individuality is truly a product of nature, nurture, or both doesn't really matter here. What is important is that it can't be replicated in a lab and can't be mass–produced in a factory. As such, it remains useless to both science and markets. Perhaps the key to survival of the «present day» is, in the end, creative uselessness.*

Amy Alexander, Olga Goriunova

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\*    Pescovitz, David. *«Visualizing Better Human-Computer Interaction»* in *Lab Notes: Research from the College of Engineering, University of California, Berkeley*. Volume 5, Issue 9, Oct/Nov 2005. http://www.coe.berkeley.edu/labnotes/1005/agrawala.html

### 1. The taylorisation of speech

Last year, Patrick LeLay, the CEO of TF1, the biggest French private TV channel, made the following statement:

*«(...) basically, TF1's job is to help Coca-cola, for example, to sell its product (...). However, for an advertisement to be perceived, it is necessary that the brain of the spectator should be available. The role of our programs is to make it available: i.e. to entertain it, to relax it in order to prepare it between two messages. What we sell to Coca-cola is some time of available human brain (...).*

*Nothing is more difficult than obtaining this availability. There lies the permanent change. It is necessary to seek at all times the programs that will fit, to follow the latest fashions, to surf on the trends of the moment, in a context where information accelerates, multiplies and gets more pervasive».* [1]

The first part of this cynical statement caused a scandal in France, but the second part struck me as accounting for what could become the large-scale economic dynamics of late capitalism. Patrick LeLay is complaining that «spectacle providers» are unable to measure the effect of their messages and hence, that they need an additional control structure that would observe the deviations so that the spectacle would be able to optimize the preparation of the brain of the spectator.

This mechanism is precisely what recent developments of the Web have started to implement. For instance, when Google bought Blogger, they took hold of a gold mine, constituted by the exploitation rights of the intimate speech of millions of internauts. In this transaction, we get the possibility to express freely

and easily, but we have absolutely no idea of what we give to Google. Nobody can tell what the price of this intimate speech is, and I think it is legitimate to ask ourselves if it is a fair transaction. The argument put forward by Google, the one that is used in the current trials about Google Print, that this is a «fair use», leaves one absolutely speechless.

So, spectacle providers send messages, the effect of which will be analized by the panoptic part of the Web, namely Google et al., the society of control, and the information will be sold back to big media. I called this enslavement mechanism the «Taylorisation of speech»: at the end of the nineteenth century, the issue of capitalism was to optimize the production process, but now, in the *«Age of Access»*,[2] where commodification of speech has appeared to daylight, as is described in my piece *«The Google Adwords Happening»*,[3] the stake is to optimize this process of circulation of information, desire and advertising.

## 2. The blind spot of Science

Hard science has become one of the main marketing tools of this «ultimate stage of capitalism». The exploitation of the gold mine of free speech makes use of means that, I believe, are contemporary of a change in sociological positioning of Science. The heroic days of the crisis in the foundations of mathematics, the breakthroughs of Kurt Gödel and Alan Turing, have been over for long.

The recent works of Albert-Laszlo Barabasi & al,[4] which started the renewal of graph theory, seemed to pave the way to this old idea of establishing a map of ourselves. On one hand, this can be considered as a very naïve, almost childish approach in a sense. But on the other hand, its accomplishment would achieve one of the greatest fantasy of Science, which corresponds to a totalitarian planification enterprise reminding us of the ideological

attempts of the beginning of the twentieth century — going back to Jeremy Bentham's utilitarianism, but — irony of history — through the hijack of the libertarian side of the Web that Google has achieved.

You can have a quick look at the following mathematic papers.

I think the titles are clear enough: *«The small world of human language»*,[5] *«Automatic meaning discovery using Google»*.[6]



HAVE YOU BEEN TOUCHED
BY HIS NOODLY APPENDAGE?

Underlining that this is a blind spot of Science has practically no effect. This blind spot is as old as the world, and there would be nothing new here if this very blind spot had not become the main battlefield of the economic dynamics of the network age. The resurgence of Creationism, with its marketing agency called «Intelligent Design» is the indication of the resurgence of that battle, as well as the ironical answer of the «Flying Spaghetti Monster».

### 3. No-market place

Facing this situation, artists have been positioning their practice. Among these many positions, I would like to underline a few:

In my article *«A glimpse beyond search engines»*,[7] I already commented the indirect answer by Edgar Allan Poe[8] to the totalizing knowl-

edge of Jeremy Bentham's panopticon, suggesting that utilitarianism breaks down at some point articulated with the question of performativity in the symbolic field.  In 1887, Stéphane Mallarmé, who translated many of the works of Edgar Allan Poe, published a poem called *«Crisis in Verse»*,[9] where he compares the use of language to the exchange of used coins of money, passed on from hand to hand in silence. This amazing intuition opposes a prosaic use of language to what he redefines as poetry, evoking «la disparition élocutoire du poête»: the vanishing of the poet behind the words.

- A somehow mirroring position is Jean Baudrillard's, in a text called *«The absolute merchandise»*,[10] where he draws a straight line between Charles Baudelaire and Andy Warhol, underlining the situation of Pop, in which the market loses its essence because the idea of commodity has been pushed to its extreme.

- In these different situations, the idea is to put the finger on this mythical place where the concept of market vanishes. In both situations, this place — I should say this absence of place — has no dimension; as soon as we put the finger on it, it vanishes. This is of course problematic if we want to investigate it further.

- The idea of Cosmolalia is that these extreme positions might delimitate something like a no-market's territory, the intersection of the blind spot of science, myths and performative art practice... The status of this pseudo-place is to remain ill-defined. Because, if you could define it, it would most probably come back into the market place of language.

- The paradoxical status of the object as commodity also appears in tales such as *«The good little mouse»*,[11] a French tale from the seventeenth century, which is considered as one of the possible origins of the legend of the tooth fairy. This tale discusses the possibility of a residual object that cannot be subjected to any trade. The impossibility of establishing a market between the different

objects (as they appear in the tale: mouse — foetus — peas — meal — nose — ear — child — tooth...) implies that there is at least one object that eschews any idea of a market: an object the loss of which would be irreducible,[12] which is something that Science cannot admit, since Science is based on the principle of conservation of some quantities (like energy, etc...).
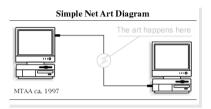
I think it's quite amusing that one of the representatives of the new alliance between Science and Capitalism, namely Richard Dawkins, in *«Viruses of the Mind»* (1991), starts with the following evocation: *«A beautiful child close to me, six and the apple of her father's eye, believes that Thomas the Tank Engine really exists. She believes in Father Christmas, and when she grows up her ambition is to be a tooth fairy...».*[13] After which, missing the point of the irreducible loss, he tries to fill in the gap by developing his ideas about Memetics in which language spreads as a virus through replication mechanisms inspired by genetics — the problem being that any attempt to objectify language leaves the very question of speech wide open.

Again, this mythical place of no-market, the blind spot of Science, is not new; it has always been here. The only claim I make is: there is a new situation because this no-market's land now overlaps with the new battlefield of late capitalism: the intuition of Stéphane Mallarmé has been turned into reality by Google.

## 4. Map Hacks

Cosmolalia aims at coping with this paradoxical territory where the concept of market, as well as the concept of map, break down. Necessarily, it will have to deal with this fantasy of building a map of ourselves — «map of the Empire that has the size of the Empire» as in Jorge Luis Borges short story *«Del rigor en la Ciencia» («On Exactitude in Science»)*[14] — that has been undertaken by the panoptic structures of the Web.

Over the last few years, artists have been intensively exploring and
   hijacking the concepts of Map (until the recent effervescence
   around Google Maps) and information visualization. In 1997,
   M. River and T. Whid proposed their famous simple Net Art
   Diagram:[15]



This is not only a manifest for net.art, but also an ironical criti-
   cal position towards the very idea of a map, repositioning the
   mysterious artistic process but taking great care to keep its
   obscurity. I suggest you also have a look at the even more ironi-
   cal answer by Abe Linkoln in 2004, in which the «trajectory»
   of art loses itself in some exhilarating «collage» map.[16]
There are other examples that illustrate the question of the interre-
   lation between maps, markets, performativity and irreducible
   loss: *«Stock Market Skirt»*[17] (1998) by Nancy Paterson, inspired by
   the *«Skirt Length Theory»*;[18] Molle Industria, *«Where Next»*[19]
   (2005); and Heath Bunting, *«Star Map»*[20] (1998).
The latter, superimposing the question of the network (the network
   of stars) and the question of the irreducible loss of the original
   plenitude (pornographic images instead of mythological repre-
   sentations) provides a perfect transition to what I want to deal
   with now: mythologies.

## 5. From Khaos to Chaos

Mythologies provide a kind of psychogeographic cartography —
   as we would say nowadays — of a pre-scientific world haunted

with an idea of globalization, which culminated later with the advent of monotheism. The propagating mode of myths, which were airborne, transmitted by speech (viral propagation within a «small-world», showing a slow evolution of the ecosystem of mythology), and at some point were frozen by historians into writings, is to be compared to what happens today on the Web: the real-time constitution of an authorless global text, a trans-mutation of writing within a new kind of «small-world» with a relational viral structure, which was implicit in the past but has now reached its tipping point and emerged into daylight.

However this «small world» of mythologies is absolutely not organized as we would expect by following the scientific paths, and as I would like to point out now, beyond this viral aspect, a very simple recurrent structure arises, as noted by Gilles Deleuze and Félix Guattari when they developed their idea of the Rhizome.[21]

It is quite symptomatic that the term «Chaos» has been subjected to a shift of meaning: the original Greek term «Khaos» means «Gap», «Béance» in French.[22] The modern meaning related to complexity and disorder is characteristic of the obliteration of the idea of «loss» by the discourse of Science.

Somehow, mythologies look like an interesting model to look at, if we want to understand further what is going on nowadays. Pandora, the first woman, from whom all the «viruses» of the world escaped instantaneously, Prometheus separating men from gods by setting a «hoax» to Zeus, the recurrent apparition of the symbolic of the network in many myths, all these elements suddenly start to find an echo in our network age.

## 6. Prometheus, prototype of the (h)ac(k)tivist

Before talking about Prometheus, let me first recall a few of the mythological stories that have struck me and surprisingly seemed to shed some light in my understanding of our global-

ized world. My idea here is to show you how these mythologies make use of very elementary structural themes, which are the theme of HOAX, the theme of gap, of separation: KHAOS, and the theme of NETWORK. I don't make a full, exhaustive study of mythologies here of course, I am just telling you about my own experience of reading quite a few of them.

KHAOS is in almost every story, starting from the original gap, then the separation of Gaia & Uranus. Khronos throws the castrated penis of Uranus into the sea. This castration is at the origin of the birth of time: it allows generations of children to escape from Gaia's womb, and is thus the starting point of the genealogy of Gods and Men, of the ramification of time, which itself is a primordial aspect of the concept of NETWORK.

Much later, Perseus cut the head of the Gorgon. The castration motif is repeated, but this time developed: the gaze of the Gorgon escapes mistakenly from the bag of Perseus and petrifies the seaweeds, giving birth to coral, a presentification of the NETWORK.

We have the idea of NETWORK again, following another separation,

when the milky way (the network of stars) spurts out in the sky from the breast of Hera feeding Herakles.

The theme of HOAX is everywhere as well. But it is most developed in the story of Prometheus: the separation of Men and Gods, which is followed by the separation of Men and Women: *viruses* spread all over the world from Pandora's jar.

According to Hesiod:

*«For when the gods and mortal men fell to disputing at Mekone, Prometheus, acting in a spirit of kindness, divided and dished up a great ox, deceiving the mind of Zeus. On the one side he put the flesh and the rich and fat inner parts hidden under the skin, concealed in the paunch of the ox; on the other side he put the ox's white bones, arranging them well with skilful deception, concealed in silvery fat. [...] Zeus: « [...] how very unfairly you make this division!»*

*[...] Prometheus: « [...] choose for yourself of these helpings the one that your heart desires.»*

*Thus he spoke with deceit, but Zeus, whose plans are unfailing, saw through the trick and wasn't deceived, but planned in his heart evil, which he would bring to fulfilment for mortal men. Then as in both hands he took up the helping shining with fat anger swelled in his breast, wrath entered into his heart, for he beheld the white bones of the ox and the skilful deception.»* [23]

The Hoax of Prometheus is mirrored by another myth in our era, called the «Turing Test», the myth of the separation of Man and Machine. I have represented Prometheus' hoax in the following way, to make contact with the questions of the roots of mathematics that are underlying here:

The symbol on the left stands for the bad-looking stomach filled with tasty flesh and the symbol on the right for the nice-looking envelop filled with bones.

### 7. Cosmolalia

Cosmolalia is built with this minimal syntax HOAX, KHAOS and NETWORK. By construction, this syntax has been chosen to try to prevent Cosmolalia from becoming a map or a network or a software.

HOAX accounts for everything that involves the questions of performativity of speech and fake; it is related to the paradoxes of set theory and the crisis in the roots of mathematics, as well as contemporary (h)ac(k)tivists performances or the splitting of the subject in psychoanalysis.

KHAOS, the gap, the loss, accounts for whatever is cut off from the symbolic field in an irreducible way.

NETWORK includes any form of science that aims at a reductionist explanation of human nature and language: this includes Cognitivism, Memetics, Genetics, Graph theory, Computer Science, Cartography, Data Mining, Quantitative Linguistics... whatever scientific or pseudo-scientific field which, at some point, intended to tell us something about ourselves.

NETWORK does not include these moments of Science where the question of truth destabilized the whole edifice of human knowledge, like the crisis in the foundations of mathematics. However, as it happens in myths, NETWORK arises at the moment after the crisis: the separation, HOAX + KHAOS (Prometheus's hoax, Pandora's womb, Heracles separated from Hera, the castration/decapitation of the Gorgon, etc.) is followed by the resurgence of the NETWORK (fennel, viruses, stars, corals respectively).

We have here a premonition of the shift of meaning I was talking about concerning the word «Chaos». This phenomenon of resurgence of the NETWORK, following the KHAOS happened in the History of Science, if we look at it on a large scale. The «Turing Test», i.e., as I said, the myth of separation

of Man and Machine, is made possible by the work of Gödel, and then allows Turing to anticipate on the development of Computer Science and algorithmics upon which the Web will be based. Darwin, another separator of Men and Gods, builds the theory of evolution. Galileo, to deal with the concept of motion, needs to extirpate the concept of desire from the physical world, in order to give birth to modern Science, and to formulate the first law of conservation. In that sense, NETWORK is a denegation of KHAOS, of the irreducible loss, a denegation on which the laws of conservation of physics are based. The objectivation of the human subject by the discourse of Science reveals the role of the NETWORK, as a panoptical graph of causes and effects where the concept of loss has no place.

There are other concepts in Cosmolalia, which could be considered as fundamental as the three I mentioned: for instance the concept of CLONE is a blend of the HOAX and the NETWORK. The CLONE is the objectivation of the subject within Science, resulting into a HOAX, the paradox of gemelity.

Another one is the HAPAX. As NETWORK is a denegation of KHAOS, HAPAX is a negation of NETWORK within the symbolic field. A hapax is a word that appears once and only once in literature. The most famous is the hapax «ptyx» by Mallarmé:

> *Sur les crédences, au salon vide : nul ptyx,*
> *Aboli bibelot d'inanité sonore,*
> *(Car le Maître est allé puiser des pleurs au Styx*
> *Avec ce seul objet dont le Néant s'honore.)* [24]

The following representation, using basic animated gifs, logos and images I found on the Web, is an attempt to represent my reading of both mythologies and my understanding of the economic dynamics of network capitalism. It shows in the central part our

present era, dominated by the discourse of science and capitalism. The circle is closed by Patrick LeLay who makes the junction between the society of control and the society of spectacle.
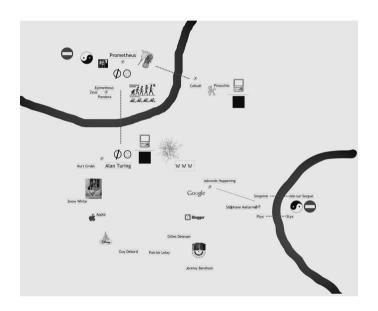
Two rivers separate our world from the mythological regions, on the left the birth of Man, and on the right, the Death region.

In principle, these regions are separated by the gaps of the rivers. However, there are ways of fording these rivers. The first one is the mirroring between Prometheus and Turing. There is a second way represented here (there are others of course), which is the story of Pinocchio by Collodi, the separation between man and inanimate matter: Pinocchio's name is, among other things, a pun on «Finocchio», fennel in Italian, the very vegetable in which Prometheus brought back fire to men from the Olympus.

I don't have enough room here to clarify further (each step of the drawing should be carefully explained and commented), but you will find further developments on my website http://www.cosmolalia.com

Let me just end on the connection with the death region: it is made thanks to the Styx/Ptyx of Mallarme and to a chain constituted by art pieces of mine *The Google AdWords Happening*,[25] and *Hapax*,[26] which is based on a personal memory from my childhood. This pseudo-map is therefore intransmissible because one of its keys is contained in my personal history. This intransmissibility is the least we could expect from Cosmolalia.

1   *Les dirigeants face au changement*, Editions du Huitième jour, 2004
2   Jeremy Rifkin, *The Age of Access,* Penguin, 2000
3   Available at: http://www.iterature.com/adwords
4   Albert-Laszlo Barabasi, *Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science and Everyday Life*, Penguin, 2002
5   Ramon Ferrer i Cancho and Ricard V. Sole, *The small world of human language*. Available at: http://complex.upf.es/~ricard/SWPRS.pdf
6   Rudi Cilibrasi and Paul Vitanyi, *Automatic Meaning discovery using Google*. Available at: http://www.arxiv.org/PS_cache/cs/pdf/0412/0412098.pdf

7    Christophe Bruno, *A glimpse beyond search engines*. Available at:
      http://art.runme.org/1107861771-3038-0/bruno.pdf

8    Edgar Poe, *The purloined letter*. Available at:
      http://xroads.virginia.edu/~HYPER/POE/purloine.html

9    Stéphane Mallarmé, *Crise de Vers*. Available at:
      http://www.tierslivre.net/litt/mallarmCDV.html

10   Jean Baudrillard, *De la marchandise absolue*, in *Artstudio*, N°8,
      Printemps 1988, «Spécial Andy Warhol»

11   *La bonne petite souris*, Available at:
      http://lescontesdefees.free.fr/Contes/la_bonne_petite_souris.htm

12  cf. the *objet a* of Jacques Lacan (*Le Séminaire)*

13  Available at: http://cscs.umich.edu/~crshalizi/Dawkins/viruses-of-the-mind.html

14  Jorge Luis Borges, *Del rigor en la Ciencia*, one paragraph short-story published in *Historia Universal de la Infamia,* 1946. Available in English at: http://www.kyb.tuebin-gen.mpg.de/bu/people/bs/borges.html

15  Available at: http://www.mteww.com/nad.html

16  Available at: http://www.linkoln.net/complex/

17  Available at: http://www.vacuumwoman.com/MediaWorks/Stock/stock.html

18  The idea that skirt lengths are a predictor of the stock market direction. According to the theory, if skirts are short, it means the markets are going up. And if skirts are long, it means the markets are heading down. The idea behind this theory is that shorter skirts tend to appear in times when general consumer confidence and excitement is high, meaning the markets are bullish. In contrast, the theory says long skirts are worn more in times of fear and general gloom, indicating that things are bearish. (from investopedia.com)

19  Available at: http://www.where-next.com

20  Available at: http://www.irational.org/heath/starmap/

21  A Rhizome, according to Gilles Deleuze and Felix Guattari, is a grouping of «heterogeneous elements» like the woman, the snake and the tree, which form a Rhizome where one element somehow reproduces itself within the other element's image, and vice versa. (Gilles Deleuze et Félix Guattari, *Capitalisme et Schizophrénie : Mille Plateaux,* Editions de Minuit, 1980)

22  Jean-Pierre Vernant, *L'Univers, les Dieux, les Hommes*, Editions du Seuil, 1999.

23  Hesiod, *Theogony,* Available at: http://www.sacred-texts.com/cla/hesiod/theogony.htm .

24  Stéphane Mallarmé, second version (untitled) of the *«Sonnet allégorique de lui-même»*, 1868 – 1887. Available at: http://www.unice.fr/AGREGATION/ConfMallarme.html

25  Available at: http://www.iterature.com/adwords

26  Available at: http://www.iterature.com/hapax

**The Invisible Hand**
**Renate Wieser**
**Julian Rohrhuber**

*In their essay Renate Wieser and Julian Rohrhuber look for the «invisible hand» — the self-organisation of individuals which, as Adam Smith argues, reaches a state of balance through self-interest and competition. This rather abstract approach re-exploring one of the sources of contemporary neo-liberal thought is illustrated through with accompanying software, involving a rather ironic use of the visualisation tools of Microsoft Excel.*

*Their software models a market, producing music as well as the afore-mentioned excel visualisation. On a meta-level they thus draw a line from the first social theories that accompanied the industrial revolution (Smith) to the recent period where the social theory of post-fordistic production and less-industrial production emerged (von Neumann). Their position has some intended humour, but it is nonetheless undeniable that their market does develop from a disordered mess into harmony, the actors finding their place in a class structure and together producing a subtle, charming tune.*

*Where is the invisible hand guiding their market towards such harmony? We need look no further than Wieser and Rohrhuber themselves, gods over markets running to their own rules and conditions. However this need not make their market a false analogy to the 'real' markets. Indeed recent thinking considers economics itself as performative. That is, economic models do not only describe economics, but /instruct/ them, by providing traders with rules to*

*follow. Consequently, the traders activities, and the behaviours of the market as a whole change to match the model. We may then draw an analogy between the activities of economists and programmers, giving us an interesting position from which to consider Wieser's and Rohrhuber's work.*

Francis Hunger, Alex McLean

> Thus every Part was full of Vice,
> Yet the whole Mass a Paradice;
> Flatter'd in Peace, and fear'd in Wars
> They were th'Esteem of Foreigners,
> And lavish of their Wealth and Lives,
> The Ballance of all other Hives.
> Such were the Blessings of that State;
> Their Crimes conspired to make 'em Great;
> And Vertue, who from Politicks
> Had learn'd a Thousand cunning Tricks,
> Was, by their happy Influence,
> Made Friends with Vice: And ever since
> The worst of all the Multitude
> Did something for the common Good.
>
> This was the State's Craft, that maintain'd
> The Whole, of which each Part complain'd:
> This, as in Musick Harmony,
> Made Jarrings in the Main agree;
> Parties directly opposite
> Assist each oth'r, as 'twere for Spight'
> And Temp'rance with Sobriety
> Serve Drunkenness and Gluttonny.»

*(from: The Fable Of The Bees, Mandeville, 1705)*

ADAM Smith is commonly known to have coined the term *The Invisible Hand of the Market*, a term that since has had a most prosperous career. In his writings, however, it appears rather infrequently — it can be found exactly three times, once in his *«The History of Astronomy»* (written in the 1750's), once again in *«The Theory of Moral Sentiments»* (1759) and, at last in *«An Inquiry into the Nature and Causes of the Wealth of Nations»* (1776). Despite its apparent unimportance, this term seems to be a very effective metaphor for what is now the wide spread belief in the self-organizing power of trade markets. While Adam Smith is usually seen as a father figure of liberalism, his own work is somewhat contradictory. This has led to a wide variety of readings of the «Invisible Hand», which range from the more well-known metaphor of self-regulation of trade markets to much less metaphoric versions of divine intervention.[1]

## The law of nature and the nature of society

In 18th century Britain, the complexities of industrialization had led to the emergence of numerous networks of economic relations, which gave rise to various strategies of how to improve their prosperity. Impressed by the productivity of divided labour, Smith tries to provide a theory that explains the genesis of order from such complexity, and gives advice how economy should be organized.

About a century earlier, Isaac Newton had been successful in explaining a multitude of phenomena by simple laws of nature. This possibility of reduction had considerable relevance in the dispute about the role of god in the world: Is the order in nature a sign of the presence of god in his creation or is it a sign of the perfection with which he has forged its laws, so that it runs smoothly like a flawless clock? It became a foundation for science to be on the lookout not for god's deeds, but for the laws he has left us to find.

The idea of the world as a self-regulating automaton has thus become a commonplace motive of scientific thought, which is a basis for Smith's economic theory of human behaviour. Though this is not stated explicitly, Smith obviously applies the Newtonian state-of-the-art methodology to a new field, which he calls 'science of wealth'. Here, the law of nature isn't concerned with gravity, mass and space, but with the basic traits of human behaviour.[2] The Invisible Hand appears here in the context of a description of unintended perfection that he discovers in economic functionality:

*«[Every individual...] neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain; and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest, he frequently promotes that of the society more effectually than when he really intends to promote it.»*[3]  (*An Inquiry into the Nature and Causes of the Wealth of Nations*)

In agreement with what Thomas Hobbes described as «homo homini lupus»,[4] it is self-interest which is the most basic human motivation. This, according to Smith, causes the natural desire to «better oneself».  For him, the source of all virtues such as prudence can be efficiently traced back to this «natural selfishness», so that even rapacity is considered valuable.[5] But while self-interest is usually found to be rather unsocial, for Smith it is the source of interaction with anonymous society, like a «gravitational force».[6] In this system benevolence emerges without intention because the individuals' egoism is mediated by a field of competition. Only if both competition and self-interest are

unrestrained does the automaton of society yield what it was intended to. Fascinated by the discovery of the natural law that structures social order, Smith writes: *«The perfection of police, the extension of trade and manufactures, are noble and magnificent objects. The contemplation of them pleases us, and we are interested in whatever can tend to advance them. They make part of the great system of government, and the wheels of the political machine seem to move with more harmony and ease by means of them. We take pleasure in beholding the perfection of so beautiful and grand a system, and we are uneasy till we remove any obstruction that can in the least disturb or encumber the regularity of its motions.»*[7] (*The Theory of Moral Sentiments*)

Part of this fascination, that has becomes so widespread towards the end of the 20th century, is the view that this process does not need any intervention apart from the liberation, the surrender to this «law of human nature». In such a system there is no need for regulation of interaction to achieve an ordered society. Rather order is caused unintentionally, due to the well-adjusted design of nature. Hence, order and morality should not be searched for by each individual, but emerge automatically due to the higher rationality of nature. This higher organization is justified by the sovereignty of 'natural laws', which demand a 'laissez-faire' approach in order not to spoil this 'plan of nature'. According to this view, it is enough to understand the basic local truths (self-interest and competition) to realize the complex order of nature, without understanding it. The notion of balancing forces and a state of stability is identified with a natural, immanent order that is beyond critique — the Invisible Hand gives every individual his proper, 'emergent' place in society.[8]

*«The rich only select from the heap what is most precious and agreeable. They consume little more than the poor, and in spite of their natural selfishness and rapacity, though they mean only their own convenien-*

*cy, though the sole end which they propose from the labours of all the thousands whom they employ, be the gratification of their own vain and insatiable desires, they divide with the poor the produce of all their improvements. They are led by an invisible hand to make nearly the same distribution of the necessaries of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society, and afford means to the multiplication of the species. When Providence divided the earth among a few lordly masters, it neither forgot nor abandoned those who seemed to have been left out* in the partition. These last too enjoy their share of all that it produces. [...]»[9] (*TMS*)

## Decentralization and the reason of reproduction

The Smithian concept of global order from balance of local forces is often seen as the origin of decentralized, bottom-up approaches, where collective responsibility is moved away from the individual. Proclaiming the end of the era of the «centralized mindset», Resnick, in his popular book *«Turtles, termites, and traffic jams»*, finds a paradigm-shift in all areas of human culture such as education, technology, politics, biology, scientific reasoning and theory of mind.[10] This change of view is interpreted as a struggle against a *«bias toward centralized theories [that] can be seen throughout the history of science»*,[11] a struggle against the power of institutions, against control, and often appears to be a struggle against power in general. To Resnick, artificial life systems (like StarLogo, the system he introduces) are interesting because they promote de-centralized thinking.

Another common train of thought identifies the «bottom-up» approach as inherently non-ideological.[12] In her article, *«The Invisible Hand and the Cunning of Reason»*, the economist Ullmann-Margalit endeavors to differentiate between a «conser-

vative» and a «non-ideological» use of what she calls «invisible-hand explanations». She complains that the Invisible Hand is used by conservative enemies of liberalism to justify the institutions of society as the outcome of a natural law that should therefore be accepted as given. According to her, the biological type of explanation (which refers to natural selection), is non-ideological, because it does not refer to the *history*, to the diachronic emergence of present structures (and therefore not Hegelian), but only to the *endurance* of synchronic relations within the present-day structure. The principle of the «survival of the fittest» is the remedy against all teleology: *«Only when an invisible–hand mechanism can be pointed to, can the spell of an explanation that postulates a creator, a designer, or a conspiracy be effectively broken.»*[13]

For Resnick it is rather a challenge to begin to understand emergent phenomena, but in his view centralized and self-organized models are strictly opposed. As a model intended to explain a behaviour within any kind of social or natural order, he finds a major difference if this model is constructed as a top-down or a bottom-up approach. Staying with the Smithian model, it is through the self-regulating benefit of competition, that every individual finds his place in society and therefore it is not necessary to express any critique about the allotment of wealth or the functionality of the system. Smith continues to write about those who *«have been left out»* (quote above continues):

*«[...] In what constitutes the real happiness of human life, they are in no respect inferior to those who would seem so much above them. In ease of body and peace of mind, all the different ranks of life are nearly upon a level, and the beggar, who suns himself by the side of the highway, possesses that security which kings are fighting for.»*[14]

It is Foucault who points out a commonplace blind spot in the definition of power as regulative, as marking *«the delimitation*

between what is allowed and what is forbidden».[15] He states that *«in the 17th and 18th century there were numerous inventions in the forms of power»*,[16] and he emphasizes that the central aim of power was not to forbid or to regulate, but to increase efficiency and productivity.[17]

Showing that the identification with law and power has its origins in the discourse of the time from the middle ages to the 18th century, he explains that *«the bourgeoisie and the monarchy managed to establish [...] a form of power that presented itself as law and that gave itself, as language or discourse, the vocabulary of law. When the bourgeoisie finally got rid of the monarchic power it did so with help of this jurisdictional discourse (which was, in fact, the discourse of monarchy), and now turning it against monarchy itself.»*[18] The techniques of power were transformed to provide more thorough and efficient ways of control. This was achieved by converting inhibitive sanctioning to productive sanctioning on the one hand, and by focusing the techniques of power towards the individual on the other.

These techniques can be seen as directed towards the body and towards life: *«There are two revolutions in the technology of power: the discovery of discipline and the discovery of regulation, the perfection of anatomic politics and the perfection of biopolitics. With the 18th century, life becomes an object of power.»*[19] We can see that for Smith self-discipline is an effect of competition, individual productivity and self-reproduction can be seen as an effect of self-interest. The discovery of reproduction as a political factor coincides with the fascination of life as reproduction. *«Then try to make them breed»*, the Queen of France is said to have answered Descartes, when he tried to convince her that animals are mere automata. This royal argumentation became an essential attractor in 19th century vitalism debate and it reappeared in the early history of computing. Attempting to find a way to understand

life, John von Neumann tried to break down the complexity of organic processes into the most elementary principles, so that he could bring them into a formalized system. In his 1939 paper *«A model of General Economic Equilibrium»*, he had worked out a formal proof that an economy theoretically can reach an equilibrium point and still be growing and he transformed labour into a fully reproducible resource, human capital. His later paper *«A General and Logical Theory of Automata»* (from 1951) can be characterized by a very similar fascination with self-reproduction. Here, he tries to formalize the problem of «complication», which can be regarded as a synonym for structural productivity.

*«We are all inclined to suspect in a vague way the existence of a concept «complication.» [...] When an automaton performs certain operations, they must be expected to be of a lower' degree of complication than the automaton itself. In particular, if an automaton has the ability to construct another one, there must be a decrease in complication as we go from the parent to the construct. [...] Although this has some indefinite plausibility to it, it is in clear contradiction with the most obvious things that go on in nature. Organisms reproduce themselves, that is, they produce new organisms with no decrease in complexity.»*[20]

## The superior power behind the Invisible Hand

Comparing Adam Smiths' economic theory with explanations found in the context of artificial life, a specific understanding of *emergence* appears to be common to both. This understanding draws a line between the simple rules of individual behaviour to the entirety that can be discovered by applying these rules. The Invisible Hand conceptualizes this entirety as a state of balance, as a perfect social order where everybody is given his very own place. To explain how this state of balance is possible, Smith's Invisible Hand becomes that of a providential designer:[21] *«The ancient stoics were of opinion, that as the world was governed by the*
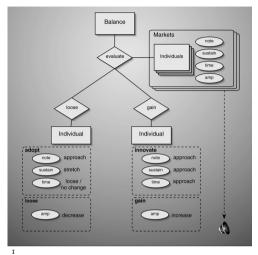
*all-ruling providence of a wise, powerful, and good God, every single event ought to be regarded, as making a necessary part of the plan of the universe, and as tending to promote the general order and happiness of the whole: that the vices and follies of mankind, therefore, made as necessary a part of this plan as their wisdom or their virtue; and by that eternal art which educes good from ill, were made to tend equally to the prosperity and perfection of the great system of nature.*»[22](TMS)

The agency of the Invisible Hand has a hidden, cunning character that is inescapable and can only be realized by accepting it as given. It is a representation of the perfection in which the efficient causes are tuned to the final causes,[23] and the balanced order this system strives towards is thus due to divine providence. Invisibility and unrepresentability are the results of the perfection that characterizes the *«cause of causes»*. For Smith competitive society provides the highest authority of justice: It is the onlooker, the *«impartial spectator»* of the public that induces its representation into each individual, *«the man within the breast»*,[24] which brings about individual morality. This impartiality and rationality is thus naturalized as an effect of self-interest in a competitive interaction of ignorant, but pre-existing subjects. Therefore the notion of the Invisible Hand works not only in an anonymous field, but very much in the individual realm.


### The Invisible Hand Machine
**Renate Wieser, Julian Rohrhuber**

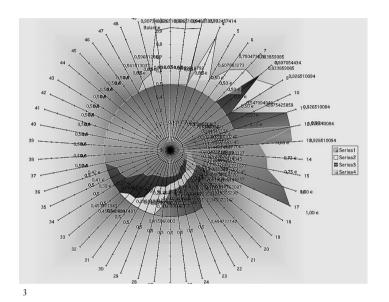**http://akustik.hfbk.net/naui.html**

For the piece «Invisible Hand Machine», we have developed an economic model which implements a somewhat cartoonified, but serious functionality of a «free» market. Like maybe every

1



2

3

cartoon, it exaggerates a mechanical model that ones mind produced as a description of how one sees the world.

Self-interest and competition, the basic forces of human society, are realized as the strive for amplitude and adjustedness to time and frequency. A market consists of a swarm of short elementary sound grains (individuals) spread over both points in time and frequencies. These individuals compete against each other for fitness (*see code below*). This fitness is objictied by a state of balance of each market, that consists in appropriate frequencies, note lengths and times. (fig.1)

In a group of competitors, randomly chosen from their value class, the individual which is closest to a proper point in time (demand) will gain, the others will loose. Gaining means that it gains in amplitude, and may innovate, i.e. approaching the desired frequency and note length. Loosing means that it looses amplitude, and it has to adopt, i.e. approaching the desired frequency and stretching out in time. In a set of markets, the economy, this means that one part of the individuals slowly adopt to a soft melodic accompaniment, whereas the other (much smaller) part innovates and reaches the desired melodic form. The system asymptotically reaches balance over time, due to the marvelous workings of the invisible hand (fig.2)

As Microsoft Excel has proved to be a tool of great explanatory value, we output the economic data to a program that keeps an Excel graph up to date . This graphics illustrates the circularity and centeredness of economic equilibrium. (fig.3) The emphasis of perfection and purity in both graphics and sound will form the aesthetic background for a very linear storytelling which aims the audience to finally feel the «excellence of balance». Maybe after having outlived this purification, we can then get rid of it.

```
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Individual {
    var <>note, <>sustain, <>pointInTime, <>amp;
    var <>timeAdopt = 0.0;
    var <>pan;
    var <>wert, <>klasse; // 3 Klassen (0..2)
        // [ ... ]
        gain {
        amp = blend(amp, maxAmp, ampRatio); // produce amplitude
    }
    loose {
        amp = blend(amp, 0.0, ampRatio); // consume amplitude
    }
    adopt { arg balance;
        var index = balance.rightIndexFor(this);
        var rightTime = balance.times[index];
        var rightNote = balance.notes[index];
        var shouldHaveTime = blend(pointInTime, rightTime,
    timeRatio);
        var delta = pointInTime - shouldHaveTime;
        // chord: choose by inner id (hash)
        if(rightNote.isSequenceableCollection) { rightNote =
    rightNote.wrapAt(this.hash) };
        pointInTime = (pointInTime + (delta *
    looseTimeWhenAdopt)).clip(0, 1); // loose time.

        sustain = min(sustain + delta.abs, 0.3);
        note = blend(note, rightNote, noteRatio);
    }
    innovate { arg balance;
        var index = balance.rightIndexFor(this);
        var rightTime = balance.times[index];
        var rightNote = balance.notes[index];
        var rightSustain = balance.sustains[index];

        // chord: choose by inner id (hash)
        if(rightNote.isSequenceableCollection) { rightNote =
    rightNote.wrapAt(this.hash) };
    // step is faster if distance is bigger. we have to support
    young inovative men
        pointInTime = blend(pointInTime, rightTime, timeRatio);
        note = blend(note, rightNote, noteRatio);
        if(absdif(note, rightNote) < 0.5) { note = rightNote }; //
    snap to quarter note difference
        sustain = blend(sustain, rightSustain, susRatio);
    }
    realTime {
        ^(pointInTime + timeAdopt).max(0)
    }
    >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

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1 see Zuidhof, 2003, for an excellent overview of the different interpretations. Emma Rothschild suggests that Smith must have known the uses of the term *Invisible Hand* in Shakespeare and Ovid, which is clearly associated with murder there: *«with thy bloody and invisible hand»* (Macbeth, Act III, Scene II). see Rothschild 1994.

2 see e.g. Alvey, 2003, p. 54ff.

3 Adam Smith, 1759, *The Theory of Moral Sentiments* IV.I.I0. (we refer to the author's indexing system*)*

4 Thomas Hobbes, Leviathan, 1651: *«man is wolf to man»* or also *«bellum omnium contra omnes»* ( *«the war of all against all.»)*. The former originates from the 3rd century BC comedian Plautus' play Asinaria, where a master refuses to lend money to a slave: *«Man is no man, but a wolf. Not a man, when he doesn't know what kind of person the other is.»*

5 Adam Smith, 1759 (*«The Theory of Moral Sentiments»)*, IV.I.I0.

6 see e.g. Alvey 1991.

7 Adam Smith, 1759 (*«The Theory of Moral Sentiments»)*, IV.I.I.I

8 ee e.g. Alvey 2003, p.63.

9 Adam Smith, 1759 (*«The Theory of Moral Sentiments»)*, IV.I.I0.

10 Resnick refers to Smith: *«Of course, interest in decentralization is not entirely new. More than two hundred years ago, Adam Smith made a forceful argument against centralized government control of economy. [...] He used the image of the «invisible hand» to drive home the radical idea that economic order and justice can be achieved (and, in fact, are more likely to be achieved) without centralized control of the economy.»* (Resnick 1994, p.7)

11 see Ullmann-Margalit, 1999.

12 Resnick, 1994, p. 4f.

13 Ullmann-Margalit, 1999, p. 66.

14 Adam Smith, 1759 (*«The Theory of Moral Sentiments»)*, IV.I.I0.

15 Foucault, 2005, p. 225 (quotes translated from the German edition by the authors).

16 ibd, p. 232.

17 ibd. p. 229.

18 ibd. p. 227.

19 ibd., p. 236.

20 von Neumann 1951, p. 312. The motive of self-preservation through reproduction reappears in the characterization of artificial life in his cellular automata: Groups of «cells» that can sustain their structure across iterations are «alive».

21 Goethe, who also worked as an economic advisor, alludes to Adam Smith's belief when he lets Mephistopheles speak about the emergence of morality (Binswanger 1998): *«Part of that Power, not understood, Which always wills the Bad, and always works the Good.»* (*Faust* I)

22 Adam Smith, 1759 (*«The Theory of Moral Sentiments»)*, I.II.24.

23 see Alvey, 2003, p. 54ff

24 it is maybe not surprising that this *«impartial spectator»* also represents the *télos* of society. Adam Smith, 1759 (*«TheTheory of Moral Sentiments»)*, VI.I.I2

**Reject Me.**
**State Scrounging**
**as Means of Production**
**Special Guest**

*«Reject me» in the form of a preliminary idea was submitted the first but was approved among the latest. The jury has had a long and heated debate with some members objecting against the project, while the other ones were defending the idea.*

*The Special Guests' project addresses the heart of the work society, where on the one hand the amount of available jobs gets reduced through rationalisation and outsourcing and on the other hand the public discourse still acts as if we lived in times of full employment. It is an example of the individual dealing with the complexity of taking a job vs. following personal interests; selling the own working force vs. being able to benefit from the general productivity of fully developed capitalism; forcing oneself into freelancing jobs vs. applying for governmental benefits.*

*«Reject Me!» also addresses the situation in Dortmund (the venue of Readme 100), where the ongoing structural change from metal and coal industry towards information technologies set free a large amount of workforce of (now) under qualified workers. 17,2% of official unemployment means that about 98600 Dortmund inhabitants (of 580000) are able to consume commodities, housing, and energy through social benefits only. Social security benefits thus also stabilize local and global businesses.*

*Bringing to discussion not only the issues of the state of today's capitalist society, but also questions of personal choice and ethics, «Reject me» turns out to be a true manifold artistic work, making one think on the general laws of the global economy, while the other focus on what the lifestyle presented by the work could mean for the local society and the individual.*

*The European welfare state is going through transformation since roughly the 1970-s, causing fights between governments and people. Radically uncovering the ever-going struggle the project presents a strong statement in many discussions: from the one of economy of art, to the one of neo-liberalism, to the one of identity formation, to the one of the object of art.*

*«Reject me» uses a well-known form. It transcends from software used to cheat systems, letters generation wizards, and other various online forms. Filling in an online form so similar to many others could become an illegal act today, which is still so surprising.*

<div align="right">Francis Hunger, Olga Goriunova</div>

The social security and benefits system in the United Kingdom provides a means of production for artists[*], enabling them to live at a subsistence level of dole autonomy and use nearly all their time for their own projects. The benefit system includes housing benefit, which allows the artist to rent a one bedroom flat and have the rent paid by local government. The artist can choose to commit benefit fraud, by earning extra income from festivals, exhibitions, shows or work-on-the-side in the black economy and not declare this income.

However during the last few years the neo-liberal policies of New Labour is under a crusade to reimpose the work ethic, and is determined to make people work in the market place rather than live off the state. Under this 'Welfare to Work' programme you are only entitled to receive benefits if you constantly and actively seek

work, and are able to prove this when requested. If you cannot prove you have been looking for work benefits will be suspended. Furthermore, with these policies of compelling people to work, wages would inevitably become depressed and existing workers would have less leverage to press for improved conditions.

This software art project seeks to subvert this government programme, by providing means for the automatic generation and printing out of authentic looking job rejection letters. Instead of looking for work, these generated fake letters can be used as the proof of seeking work, but at some risk of being discovered that they are fakes.

The software is based on modeling typical job rejection letters. These were collected via internet searches. The software will generate letters that consist of rejection texts, company names, addresses and logos, dates and letter headers, automatically creating variations of layouts and typeface. It is then just a case of pressing GENERATE and PRINT. By photocopying the letters, it is possible to avoid the need of using different paper types. They have to be signed too.

---

\*   with this text I use term artist, whilst the benefit system is available for the adult population of the UK.

**Your Name:**

John Doe

⦿ Male
◯ Female

**Your Address:**

Flat 6

56 Northhampton Road

London

**Post Code**

NW1 9YZ

[Generate] [Print]

---

26 / 7 / 2005

John Doe
Flat 6
56 Northhampton Road
London
NW1 9YZ

Ref 4Y6BTLJ.

Dear John,

  Thank you for your recent inquiry in career opportunities with us.
After consideration of your CV we are unable to offer you an interview at this time. We would like to say that we received a large ammount of applications from qualified candidates.
All applications and resumes received are kept on file for approximately one year. During this time, if you wish to update your information or inquire about another opportunity, please contact our Human Resources Department. We are sure you will do well in your future employment endeavours.

Yours Sincerely,


Colby Gabel
HR Admin


          SONET Info Sciences
          409 Ashley Avenue
            Lancaster
             LA5 4AF

---

**Your Name:**

John Doe

⦿ Male
◯ Female

**Your Address:**

Flat 6

56 Northhampton Road

London

**Post Code**

NW1 9YZ

[Generate] [Print]

---

Math Research
385 High Street
York
YO5 1DJ

John Doe
Flat 6
56 Northhampton Road
London
NW1 9YZ

26-11-2005

Our Ref JBWNC62.
Dear John,

Thank you for inquiring about employment opportunities at Math Research. After extensive study of your resume we will not be selecting you for an interview. This is not owing to your suitability, but that we were overwhelmed with impressive candidates. We have kept your curriculum vitae on file to see if your details would match our requirements for open positions Best wishes for the future.


Yours Sincerely,


Ben Cackroft
HR Specialist.

---

          

## Window 1

Your Name:

John Doe

◉ Male
○ Female

Your Address:

Flat 6

56 Northhampton Road

London

Post Code

NW1 9YZ

Generate    Print

---

Aplus Media
143 Cavendish Lane
London
N7 1FC

John Doe
Flat 6
56 Northhampton Road
London
NW1 9YZ

12-8-2005

Dear John Doe,

ref LAJEG0R.

   Many thanks for your time and interest in the post of New Media Developer. After consideration of your resume we will not be selecting you for an interview. We would like to say that we were overwhelmed with experienced candidates. Your resume will remain active in our database for up to one year and you will be considered for future positions for which you are well-suited. Note that you do not need to resubmit this resume unless your contact information or work history changes. The best of luck for the future.

Regards,

Dennis Cabalitan
Human Resource Consulting.

---

## Window 2

Your Name:

John Doe

◉ Male
○ Female

Your Address:

Flat 6

56 Northhampton Road

London

Post Code

NW1 9YZ

Generate    Print

---

10-11-2005

John Doe
Flat 6
56 Northhampton Road
London
NW1 9YZ

Dear John,

Our Ref LCEWHOJ.

Thankyou for recent inquiry in joining our company After study of your resume we will not be selecting you for an interview for this position. We would like to say that we received an overwhelming ammount of applications. Should you wish to resubmit your resume at any time to keep our files open, please feel free to do so. I wish you the best in your current endeavors.

Yours Sincerely,

Elkan Caillouet, Recruiting Team.

SAN Entertainment
320 Princess Avenue
Newcastle Upon Tyne
NE9 9EJ

**Outsource me!**
Leonardo Solaas

**http://solaas.com.ar/outsource/**

> «Outsource me!» by Leonardo Solaas presents a competition within
> the competition of Readme 100. This ironic subversion is repeated
> on various levels of the project: it subverts the usual outsourcing
> relationships, as well as subverting the idea of the delegation of
> «technical» work by the «creative» artist to an «uncreative» pro-
> grammer (or any «hands-on» person). One proof of the project's
> success is in the discussion that happened in the comment threads on
> Solaas's call for submissions to be his employer . Irony does not tran-
> scend all borders: one person took the call literally and was dis-
> mayed by the apparent reiteration of the same old pattern of the
> «uncreative programmer» and «handless artist.»

«Outsource me!» is a two-phase project: a recruiting phase and a pro-
duction phase. When he posted the call for ideas, Solaas, who is
Argentinean, considered limiting the circle of potential «employers»
to people from so-called developed countries. This twist could have
made the project funnier but could have seriously limited its scope,
so Solaas and the Readme 100 organizers (who acted as Solaas's
«meta-employer») decided to leave this option out. The mere fact
that potential employers had to look through Solaas's lists of skills,
interests and past works when deciding whether an idea is suitable
for him seemed enough of an ironic twist.

*Among the submitted projects — which were of a generally high level — were a few excellent ones. A favorite of this text's authors was «Appagotchi» by Eric Londaits, another of whose submissions was eventually selected to be realized. «Appagotchi» suggests creating a simple software application that must be nurtured (opened, closed, saved, etc.) similar to a Tamagotchi pet; only if it is sufficiently cared for will it grow into a full-featured, overly-complicated application. «Appagotchi» turned out to be too complex a project to be realized in the short time period available, so Solaas and the Readme 100 organizers decided against it. Having to negotiate with both an employer and a meta-employer must not have been an easy task for Solaas, especially given the weight of all the project's accumulated irony. One wonders if he is personally satisfied with the results of his project's subverted logic, or if he eventually tired of dealing with the multiple twists and levels of supervision he had devised. Then again, real jobs quite often involve the stress of coping with multiple supervisors who have conflicting sets of demands and priorities, and who, despite existing within organizations that often have meticulously organized institutional structures, somehow manage to function as if there were no coordination at all. Maybe Solaas's project isn't so ironic after all — or maybe it simply reminds us of one of the painful ironies of working life.*
*«Go Logo» by Eric Londaits is the winning idea of Solaas's contest. It was implemented in an incredibly short time period: a little more than two weeks. «Go Logo» makes its audience even more aware of logos' omnipresence and aesthetics: one of the logos generated by «Go Logo» when it was presented in Dortmund turned out to be an almost exact copy of the logo of the hotel at which the Readme participants and organizers were staying.*

Amy Alexander, Olga Goriunova

**The story**

When I first saw the call for projects for Readme 100 Software Art Festival, I didn't think it was for me. As a software artist, I was exploring several different ideas at the moment, but I could not see a match with any of them. So I just closed the browser page and went away — it was one more of the countless websites we leave with no further consequences on our lives.

Only, this one somehow stood with me. It hung around in the intranet of my brain and kept coming back to my attention window. It was something about the proposed subject: outsourcing. It was touching me. After all, I am an outsourced worker. I'm a programmer and site developer working for American employers.

At first I entertained this little idea, not taking it too seriously, but finding it nevertheless engaging: to put the outsourcing relationship upside down. I started to think about momentarily changing the balance of power among employers and contractors, which is also a small-scale model of the tension between developed and emerging countries. It was a chance to rewrite the rules of the game and to play a little joke on a very serious subject. It was also about my life.

This was probably the biggest hurdle I had to overcome in the process of turning this funny idea into a real project. Until then, my works had been rather abstract and detached. Now, this was also a very conceptual project, but it was also about me, about my work and my everyday life, about many of my frustrations and ambitions. It required me to step into the stage and expose myself in a way till then unknown to me. I could not keep a scientific

distance with this, my stance had to be closer to that of an actor, and I was not sure I wanted that.

But the idea would not let me go. It grew and gained neater edges, words started coming for the would-be Agreement that was to regulate this altered outsourcing relationship, and soon I realized that I had no chance but writing down the project and submitting it. This is not the way I usually develop my works. In general, I push my ideas forward. But now I was pulled by one.

Still after submitting the project, I felt I didn't had to worry very much. I didn't really think the selection committee would be choosing it. It was just too crazy, too unpredictable and open-ended. I was proposing an adventure, not only for myself, but for the Festival as well.

I was wrong again there. They not only chose the project, but supported it enthusiastically. Olga Goriunova and Alexei Shulgin were involved in every stage of the development, since the configuration of the site I made for receiving the submissions, to the execution of the piece once we had chosen a winning proposal. They assisted me with their opinion and experience all along this complicated but highly instructive process.

**The idea**

I remember having an enlightening experience with one of my first foreign employers, an American. When we first made contact, in my ingenuity I asked for an hourly rate that was somewhere in between the Argentinean and the American standard fees. This was looking just fair to me. If there was a gap in the price of labor, it seemed right to share the benefit and enjoy a situation where everyone wins.

Soon I had to notice I was wrong. My skills were very interesting, but, why was I charging so much for my time? It was surprising. My would-be boss was aware of the usual fees in Argentina and

was expecting me to stick to them. I'm Argentinean after all. I live in Buenos Aires. That's undeniable. And he was outsourcing. He was counting on the benefit of that.

I pondered over the situation. It was not a bad deal after all. The rate he was proposing was maybe a little over what I was charging then to my local clients, and more important, he was promising a continuous stream of work. I had to choose between my personal idea of fairness and some more money on my pocket. Well, as you can probably imagine, I said yes. Reality wins. As things turned out, this American is at the moment my main employer and we developed an excellent working relationship. But I had to learn my place in the world.

Now I regard this little episode as the origin of Outsource Me! It was my personal lesson on the nature of outsourcing, and it made me recognize the various good and bad sides of this strange new form of association that the global communication technologies have made possible.

Still, I am lucky. I never had to compete with fellow programmers in the open Internet market. I felt rather impressed when I saw the sites were coders and buyers get together. Each request is a kind of reverse auction where the buyer puts all the conditions and the programmers have to show they are the best while simultaneously placing the lowest possible bid. And they not only have to be cheap and good, but timely and flawless, because, if they are chosen, their employer will later rate their work, and the rating is the most important capital they have at the site. A good rating will increase their chances to be commissioned, maybe even to charge a bit more next time, so they are under high pressure to keep it perfect.

No one is forced to take part in this kind of market. Everyone is there willingly. But I can't help feeling there's something terribly sad to it. The rates are often low even for a developing country such as mine. For someone trying to make a live as a freelance coder,

I imagine it must be difficult to relax. It's like giving exam every day: there's so much competence that only the fittest survive. Is it not a waste of much intelligence and energy, a life devoted to keeping a perfect 10 at rent-a-coder?

So, Readme 100 was my chance to play on this. Outsource Me! is a subversion of the outsourcing relationship. The balance and geometry of this rapport is altered in many ways at the same time:

— To start with, I was going to be commissioned for developing a software-art piece. I was mixing up two areas of my life that used to remain distinct: the work that earns me money, and the art that gives me pleasure. It was about this dream we all have and only a few make real: being hired to do what you love.

— Then, I was not going to compete with anyone for this job. Quite on the contrary, the employers were going to compete among them to have me developing their idea. I was going to have the power of choosing the one I liked the most among all the proposals.

— I was not going to be paid by the employer, but by a third actor, the MetaEmployer (the festival organization), so the former one would be deprived of the usual power of those who pay.

— I was also outsourcing a task myself: thinking an idea for the software art piece I was going to present at Readme 100. So, a certain symmetry was introduced into this relationship: my employer was also working for me.

— A relationship that is usually binary was becoming a triangle. The introduction of the MetaEmployer altered the schema in many ways, some even unexpected for me. It acted both as a boss and as a helper, as a neutral third part that was nevertheless deeply engaged with the project, and as a source of skill and support. The role of the MetaEmployer was perhaps, talking now from experience, the single most important invention of Outsource Me! I'm sure many outsourced workers would love to have one if they could only imagine how it is to have one.

— A relationship that is usually private was becoming public. The whole process was open and all those taking part were going to be on stage for the show.
— The ideas for art pieces were also going to be public, as all submissions are viewable by anyone at the website. This requisite probably deterred many people who subscribe the usual position that ideas must be kept secret and not be shared, and were thus not ready to free their brainchildren on the net.
— The project for Readme 100 was actually two projects. During the festival we presented a work and a meta-work, such as I had an Employer and a MetaEmployer. Go-Logo is inside Outsource Me! as a piece of art inside another piece of art.

**The development**

The project development had many stages:
— Writing the texts that were going to introduce and sustain the proposal: the Facts, the Agreement, my Skills and Interests.
— Setting up a website to put this texts on line and gather the submissions.
— Writing an open call and broadcasting it through the usual communication channels in the digital arts community (websites and mail lists).
— Answering the comments, questions and sometimes surprising interpretations of the proposal by would-be employers that required clarifications before submitting their ideas
— After the deadline, choosing the winning idea, which had to be both interesting and feasible within the limited time frame we had before the presentation in Dortmund.
— Developing the piece.
— Putting it on line and preparing the presentation for the Festival. The Outsource Me! website was quickly designed and configured using Drupal, an open-source Content Management System based

in PHP and MySQL that I'm using a lot for my 'serious' work.

The call for submissions remained open for three weeks. During that time, we had 24 proposals submitted by people from various points of the world, from Croatia to USA and from Brazil to Norway.

For me, it was surprisingly difficult to choose a winning idea. I think I respect a bit more the work of jurors in competitions now that I've been through something similar. Many of the proposals were attractive. Some were just too complicated to develop within the tight schedule we had ahead of us. Some were suggestive but not clear enough, or something very similar had already been done.

It was our preliminary idea to choose an Employer from a developed country. This was fitting the concept of the project, so Olga, Alexei and me had agreed on that. I remember sending to them a shortlist of the submissions I thought were interesting or feasible, and commenting at the end: «Then, there are this ideas from Eric Londaits, which are really very good. But I'm leaving them aside, since he's not only Argentinean, but a friend of mine». But they also thought his ideas were good. They told me, «Never mind he's your friend, let's go for them!»

This was really an unexpected turn of the events, but then, what the hell, why not. Since we were creating our own rules, we were also free to change them. So I ended up having an Employer who is also a friend, and that's always nice. It was also a further tweaking of the outsourcing schema, because Eric lives in my city, so we cannot really call it outsourcing anymore, and is also my friend, what is not the usual state of things for an outsourced worker.

So we went for 'Go-Logo'. It had an interesting concept, a probably engaging visual dimension and it was possible to develop the idea, if not fully, to a reasonable extent before the presentation. It came also as a natural follow-up to several investigations I had been carrying on generative systems.

The execution of the idea was accompanied by very much back-an-forth among the three sides of our novel association: the author of the idea, the responsible for it's development (who, as an artist himself, had his own ideas about what was right or wrong), and the MetaEmployers, who engaged actively with their own points of view. The discussions were very interesting in itself and touched on several fundamental points, such as the nature of a software art piece, it's relation to functionality and user expectations, etc.

I used Flash and ActionScript because it has become for me an optimal platform for fast development and solid results that are viewable on almost every browser in the world. Also, the vectorial nature of Flash graphics was a natural fit for logos. I developed several algorithms to produce graphic results that had to be both simple, interesting and varied. This is a difficult equilibrium which is not always possible to attain, but there's still ample room to improve and make the graphics better and more logo-like.

Algorithms are remarkable for their absolute lack of aesthetic criteria. So the challenge is coding some that catch the soul of 'logoness' and output results that we, humans, can regard as nice and well-formed.

Another condition we agreed on with Eric is that no randomness was going to be involved at any point during the process. I personally think that too much random functions are around in contemporary net art works. It's like a recipe for brewing instant pseudo-data where you actually have none. Moreover, this limitation allowed us to have a one-to-one association between words and logos. Even since the first version I put on line, a funny interchange arose: «Try this word!», «Take a look at that one!».

Following a suggestion form Eric, I used a well-known cryptographic hash function, md5, to generate a pseudo-random 32-cipher hexadecimal number from any character string entered into the

textbox. This regular input is an excellent source for the algo-
rithms to take the various parameters needed for each drawing.

So, any word in any language, even in those which doesn't exist, will
produce a logo. There is no semantic connection between both.
Inside Go-Logo, words are treated as raw binary data. The
meaning is all on our side.

>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

Open Call for Proposals
Get your Software Art Piece Done for Free

OUTSOURCE ME!
http://outsource.solaas.com.ar

Have you ever dreamt of having a piece of software art (1) you could
call truly yours? Or had the feeling that most media art is
dull, and that you could do it better? Or had a marvelous idea
you could not realize for lack of time, commitment or expertise?
Well, your chance has come.

No need to mess around with abstruse programs or bother with dreary
code. The world is full of people willing to do the hard work for
you. That's what outsourcing is about. Those are the rules of
the global electronic market.

It doesn't cost much. Actually, just for this time it will cost you
nothing.

Leonardo Solaas, an Argentinean programmer and net artist, suggests
reversing the rules: only once it is not the programmer who is
chosen by the employer but it is the employer who is chosen by the
programmer. He is looking for someone to tell him what to do, thus
himself outsourcing the task of getting an idea. Submit yours!
Become his boss! Submit your ideas at
http://outsource.solaas.com.ar till October 3rd, and you could be
the lucky winner of a possibility to implement YOUR piece of soft-
ware art. If Leonardo chooses your concept, he will become your
outsourced Contractor for this work, and you will be his Employer.

You could learn about Leonardo's skills and interests (at
http://solaas.com.ar/outsource/leonardo) to figure out whether
your proposal would fit his experience.

All this is made possible by Readme 100 Temporary Software Art
Factory (2) (a.k.a. the MetaEmployer). The resulting piece will
be presented at a festival taking place on November 4-5, 2005, in
the State and City Library of Dortmund, Germany.

* * *

1.  For those who are not sure what software art is, please, learn
    more at http://runme.org/faq.tt2
2.  http://readme.runme.org

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The Facts

• Outsourcing is a growing reality, made possible by the world-wide
  development of communications, with deep political and economi-
  cal implications that concern the relationship between devel-
  oped and emerging countries.
• There is a gap between common wages in different regions of the
  world that sustains the whole phenomenon of outsourcing. People
  working in an emerging country for a distant customer can earn a
  revenue that is usually better than local rates for an equally
  qualified job. On the other hand, buyers in central countries
  pay less for the job. From this point of view, everyone wins.
• If, however, we consider the fact that the differential between
  first-world and third-world rates remains mostly in the buyer's
  pocket, we can see outsourcing as a new form of exploitation.
  Moreover, a particularly insidious form of it, since all partic-
  ipants take part willingly in an open, global market. So, it
  might be seen as abuse with the face of freedom.
• It is true that, in a macro level, outsourcing represents a net
  flow of money from developed into developing countries. But it
  also represents a flow of talent from the latter into the former.
  And it is intelligence, the organization of complexity, that
  ultimately creates wealth. Peripheral countries export the main
  resource that might help them emerge from underdevelopment.
• Stiff competition between knowledge workers in developing coun-
  tries guarantees sustained low fares, and the perpetuation of a
  state of things where contractors will most likely never become
  employers or use their knowledge on their own behalf.
In regard to this, I (the worker) make the following

Proposal
• To reverse the usual situation, and to make a call for an Employer
  for my outsourced job. As employer of my employer, I will have
  the possibility to decide what I do.
• To outsource myself the task of defining the idea and characteris-
  tics of the piece of software art I will develop for Readme 100.

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The Agreement

This is an agreement between Leonardo Solaas («The Contractor»),
   the author of the selected idea («The Employer»), and Readme 100
   Temporary Software Art Factory («The MetaEmployer»). It governs
   the development and execution of a piece of software-art («The
   Work»), under the following terms:
• The development of the process leading to the realization of the
   Work will be carried in two stages:
An Open Call for ideas, plans or proposals for the Work
The development of the Work itself, undertaken by the Contractor
   according to one of the ideas entered during stage (A).
• During stage (A) any person will be allowed to submit any number
   of ideas at the site outsource.solaas.com.ar, without any limi-
   tations whatsoever, besides being likely ideas for a piece of
   software art.
• On submitting an idea, participants in the open call will take
   into consideration:
The Contractor's past works: http://solaas.com.ar/
The Contractor's skills: http://solaas.com.ar/outsource/skills
The Contractor's interests: http://solaas.com.ar/outsource/interests
• At the end of stage (A) the Contractor will choose an idea among
   those submitted.
• In selecting the winning idea, the Contractor will evaluate:
That it is feasible with skills he possesses or can rapidly acquire
That it is in accordance with his interests and past works
That it can be executed within the allocated time frame
• The author of the selected idea will instantly and automatically
   become the Contractor's Employer for the term of development of
   the Work.
• The Employer will be notified of his new status on the e-mail
   address entered upon registration. The Employer's approval or
   confirmation of notification shall not be required for the
   development of the Work, since the act of submitting an idea
   implies permission to execute it.
• The Contractor would prefer an Employer from a developed coun-
   try, but he will also be open to consider proposals from emerg-
   ing (or submerging) nations.
• As author of the winning idea, the Employer will be awarded the
   full sum allocated for the project by the MetaEmployer, with the
   specific and unalterable purpose of paying the Contractor.
• For the sake of simplicity, the MetaEmployer will transfer the
   aforesaid sum directly to the Contractor
• The Employer will be granted the rights to the Work, but agrees

to release it and its source code under the Creative Commons GPL
       license.
* The Employer will be credited as author of the idea every time
       the Work is presented or exhibited in any form or context.
* The completed Work will be introduced to the Employer, the
       MetaEmployer and the world at large during the Readme 100 festi-
       val, taking place on November 4-5, 2005, in the State and City
       Library of Dortmund, Germany.
* The submission of an idea implies the unconditional acceptance
       of the terms stated in this agreement

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## Go-Logo
### Eric Londaits

**http://solaas.com.ar/gologo/**

The selected submission I sent to Leonardo for the
«Outsource Me!» project reads:
*In the future, the only way to be heard will be having a flashy logo,*
*a catchy tune, and your own pop star endorsement. And I don't*
*just mean for corporations... family dinner conversations*
*will actually be like this as well.*
*Go-Logo will be the basic survival kit for that future.*
*Just enter a word (or two or three words, but not much more)*
*and Go-Logo will instantly create a random unique logotype*
*that is sure to capture your audiences.*
This prediction is certainly tongue-in-cheek, but comes close to
what I think the future will be like.
Homes today use most of the same software as business and pro-
fessionals do. Office software like word processors and spread-
sheets are the same for home or professional use, and the unli-
censed use of software is common enough for kids to be learning
desktop publishing, graphic design and 3D modelling with very
expensive software suites in their own computers. Also, scanners
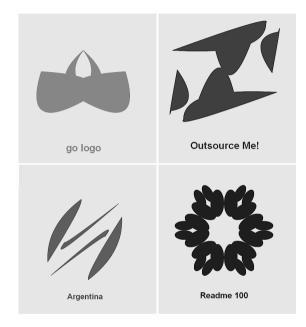and colour printers of photographic quality are installed at many

homes along with digital photo and video cameras. With all these tools at hand high school students hand papers to their teachers which look better than many professional reports, family movies are being digitally edited, mixed with Hollywood-like soundtracks and stored in DVDs, and both small and home businesses have web sites, ads and promotions that imitate the big league players of advertising. As the tools get easier to use, forms of communication traditionally reserved for large corporations are used by everyone. The bar for getting people's attention is raised.

Logos are one the most characteristic forms of communication used by corporations to reach audiences. Logos are everywhere, identifying corporations themselves, their branches, their product lines and their individual products. So it's natural for people to want logos for their own small scale projects. If logos were even easier and faster to generate than they are now, they'd probably take over everything. Go-Logo attempts to be an early version of the logo generating program of the future. I asked Leonardo for Go-Logo to have an interface that is as minimalistic as Google's. Even better, think of the «I'm feeling lucky» button that Google has, which takes you straight to the result instead of showing the best matches found. Type a word, and the perfect match between word and logo should be made.

The plan was always for Go-Logo to generate random logos, instead of attempting to do semantic analysis of the word or phrase entered. The result might not always be appropriate, but at least the program is not limited by a poor comprehension of the subject. Nike's «swoosh» logo is one of the most powerful in existence, and yet we cannot say for sure that it's familiar shape is motivated by the word «Nike» or by sport shoes. The brand brings ideas to the image, and the image brings some of its own to the brand. It builds on what it represents, instead of being limited by it. What the ideal Go-Logo should be able to do is pro-

go logo


Outsource Me!


Argentina


Readme 100

duce every single possible logo through it's various internal drawing algorithms; that would give me some hope that every word could find the perfect one.

When I was able to use the first version of Go-Logo I was surprised by how powerful the idea of having every word tied to a simple drawing was. I realized that as much as it was a logo generator, it was also a browser for a Word-Logo space. Frantically I typed the name of every object around my desk, brands, friend's names, seeing what their logos looked like, and how they represented them. I was reminded of the video for George Michael's cover of «Killer/Papa was a Rolling Stone»(directed by Marcus Nispel), which pulls words out of the lyrics and shows them on screen as consumer product logos. Just like in the video, where the meaning of the word and the picture don't seem to match, there are some ideas to be dug from that gap in between.

Go-Logo is the early ancestor of what some day might be the definitive commercial logo generating application. Future developments should target variety and freedom of shape, instead of being constrained by a pre-packaged and «safe» rules of aesthetic composition. It's still early R&D of logo generation, as early R&D of functional technologies is usually art.

**MapOMatix**

Yves Degoyon, elpueblodechina,
Sergio Moreno, Jaume Nualart
and others

▬▬▬▬

http://mapomatix.sourceforge.net

### Beyond Psychogeography

There have been quite many collective mapping and psychogeographic tools developing in the past years; and some interesting issues here seem to be the following:

1.  Usability. Will or not the people tools are addressed to be using them? Do the tools fulfill the users' requirements? How to include all possible types of tags that correspond to various and sometimes very individual psycho-experiences the users might have?

2.  Request-demand. Does the need for such tools exist at all? Collective mapping is very interesting conceptually and very appealing to work at, but is there any real need coming from the community?

3.  Control and censorship. How to be sure the content is «free»? Is any moderation required? How to filter out the irrelevant, protect from vandalism and keep high quality level? (And, what the quality criteria would be?)

4.  The source of geographical maps used — in case the system is based on existing maps.

5.  Open source or proprietary, centralized or decentralized?

6.  Redundancy issue: how to insure that the work started today will survive the hardware and software development of tomorrow?
In the context of software art two distinctive features of

*MapOMatix make it primarily interesting. Both features make the system much more open for use than the competing (or, should I say, developed in parallel) systems are.*

*Namely, it is the possibility of mapping (and creating) non–geographical spaces along with mapping geographical ones using the same tools. The second is the timeline option.*

*These additional features bring MapOMatix to a principally new level, potentially allowing for richer individual and collective story–telling and psychogeographic practices.*

*Map is an old and a very familiar paradigm of data visualization. Map is about distances between nodes and transport routes; it is about populated and empty areas, natural and human–made recourses. The concept of a map sits very deeply in our cultural memory and therefore is unavoidable when the demand for visualizing new types of data comes. MapOMatix has a good potential to develop in such a universal mapping tool helping people to not only navigate in, but also create subjective, artistic maps of all kinds of spaces. Perhaps, the long–awaited and always–eluding Map of the Internet will come true some day …*

*With its timeline option MapOMatix' can be used as a story–telling tool of a new generation, where a story is represented by a sequence of tagged maps, each with its time–stamp. Do we witness birth of a new exciting artistic tool? If so — the MapOArtists will not make us wait for them for long.*

Alexei Shulgin

## PGS versus GPS: On Psycho/Subjective Geographic Systems
### by elpueblodechina dialoguing with Yves Degoyon (MapOMatix)

Looking back on several generations of mapping tools and projects, related in particular to the 'locative media' trend, still we feel that some levels of representation are missing in most of the maps that can be produced. We are interested in locating collec-

tives and the activity of the multitude rather than into locating individualistic practices. We suspect that the logic under which some geo-specific mapping projects are developed is the logic of the market or other self-referent narratives.

- A subjective positioning system would be developed after working on questions such as: what is the meaning of location when the activities that are mapped are constituted by human practices? Some immaterial entities are missing in the mapping of human activities, for example: how can you trace the influence of a writer in a network of conversations? When trying to give location to the immaterial, ephemeral, distributed and non objective nature of, for instance, human labor, human play and civil participation, it seems that all monitoring-based systems will fail in locating the subjective nature of flows of human activity and the processes involved.

- S.I. (Surveillance Intelligence (systems)) are based on logic of identification and tracking, which becomes insufficient and dangerous. Insufficient—because it doesn't relate to immaterial information as joy, fear or participation; and dangerous—because it potentially may be used to execute surveillance and control. Within a spotting system using GPS or Radio Frequency IDentification (RFID),[1] who will guarantee that our privacy is protected and that the rights of secondary citizens (immigrants, sin papeles, homeless, sex workers, …) will be respected? And that this technology for tracking bodies will not be only a way to control someone that may be a menace to the dominating model?

- Tracking technologies are insufficient to describe immateriality. If the description of territories is only based on geographical data (GPS), how can we draw a clear picture of human actions, history and struggles? How can maps be made to represent the immaterial labor of such people who cannot afford expensive technology when the techno-positivist approach to cartography is the only one proposed?
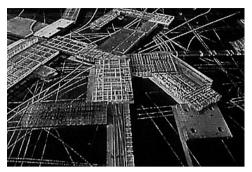
A series of reinventions of the city are being performed by people trying to find alternative ways to live in urban environments. These reinventions work as multiple forms of appropriations and ways to bend city programs based on the most efficient ways to allow consumption. Different practices working on ideas related to the free, the open and implementing ways to innovate in civil participation, self-mediation and software culture.[2] The writings and early psychogeographic interventions of Situationist International, of those as Asger Jorn, Constant and Guy Debord[3] as well as the categories of daily consumption and rhythmanalysis described by Henri Lefebvre[4] are to be seen as operating in the cultural background of these reinventions. 'A different city for a different life' (Constant) may be the motto under which these innovations develop ways to avoid or to alternate dominant narratives such as consumption, profit and competitivity.

Nevertheless we think we have to be conscious of marketing agendas always hungry for novelty. We can be sure that any possible form of innovation whether artistic or technological is potentially suitable for its incorporation into the market, even if this innovations deal with new ways to live the cities. What would be the ways to maintain independence from market logics?

**(GPS as a means of counter-measure ?)**

The use of Global Positioning System becomes powerful for independent media practitioners when it can survey the activity of police or other control forces. In this sense, it can be seen as useful, when it counterbalances the forces of world government[5] but, even in this case, it reveals itself as insufficient since a place as a set of geographical coordinates does not contain the experience of the place. Furthermore, it fails when it's used in independent practices if we consider that it makes a lot of sense in
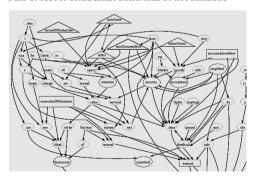
Constant Nieuwenhuis: Group sectors, 1959 Coll. The
Hague's Municipal museum



Map of AutonomiaAerea organised by rotorrr.org



Preliminary analysis of Consumption Molecules by
elpueblodechina

terms of market logic. Who is protecting our rights for privacy in an era of terroristic global fear?

These threats to our privacies are being performed in increasingly sophisticated manners involving network technologies and data mining. Nevertheless the problem is not only the technical availability to track bodies, but mainly the logic under which such 'identification' is being performed. To be spotted from a satellite means to be tracked as an identity, a defined object, to which some standard coordinates are related. Identity as these data sets, is soon to be swallowed back by a system based on market values.

**(a consumption based system looks for identity as a datastructure)**

A system working under a paradigm of consumption and infinite profit works under parameters of identification such as age, income, number of children. These parameters are those discrete units used in consumption computers if we may understand commercial structures as such. Our consumption is embedded into huge matrixes of indicators, commercial trends, value coordinates. As this complexity increases there is a suitable structure to synthesize into one body the interplay of relations between numbers. Acting as a body of relations, identity, identity models and consumer profiles are the most effective data structure to attach economic indicators.[6] They get assembled in such ways that not only numbers derived from economy have a body to relate to, but also the model constitutes an ecology where individual adaptations and interpretations will grow and project (the ecology of the identity model for instance).

If independent practices work under a paradigm of identification they will be swallowed by a system based on market values, incorporated to its own logic that is permanently trying to renovate itself at various levels as consumer profiles and consumption habits to name a few. The logic of identification and tracking,

and a concept of location as sets of geographical data is closely related at least to the narrative of monitoring and targeting. They add up to other practices of identification as consumer profiles and consumption models and constitute a search for a very determined pattern. This structure is identity, a closed narrative, trackable, clonable, marketable. Practices related to the imaginary dwell on becoming new imaginary consumption items if they focus on closed narratives like tracking and spotting the individual. GPS maps may evolve into futuristic profiles of a consumer picking up locations in the globe to experience satellite vision and ultimately satellite shopping.

In the GPS sense you cannot locate the origin of a social struggle.

## PGS vs. GPS
## (I don't want to be spotted from a satellite)

If I track you, spot you, I can control you. MapOMatix is a tool for chameleons. It is about collaborative imagination, a map that draws a tissue of human practices, an active map in this sense, since it empowers the activity of collectives. It is giving them a location, in some way a precious materiality and an affirmation to their precarious activity. People reinventing the city, reinventing cartography and geographical location.[7] Some can say, they are mental maps or imaginary maps...

However, the aims of many groups working on psychogeography are not on the direction of creating new imaginary consumption items, more so on fighting back consumption models based on the repetition of self-referent narratives that constitute the magic of goods. These collectives are attractive because they plot reinventions in the optic of *potlatch* pursuing encounters or meetings encouraged by civil participation and no other commodified gain.

The logic of identification walks tightly along the narrative of war, a subject/object as the target for a gun machine. And war goes

along another logic, that of the powerful, the rich and the right.
The mapping of subjective activity, that of a human being acting in her ecology is to be performed in a subjective way. This way may be psychogeographic, derived from the psychological perception of places. MapOMatix in this sense preserves the subjective nature of what mapping is and simultaneously becomes a nomadic artifact that is a platform for collaborative activity. As a platform it gives materiality to other nomadic agencies. MapOMatix is a Psycho Geographic System (PGS); its nomadic nature gives presence to distributed counteraction.

## MapOMatix as a geo-wiki, a story-teller for the multitude (of some choices of implementation)

In the times of real-time fear watching, when centralized and controlled instances deliver localized and time-stamped information, based on satellite data but processed through a chain controlled by big telecommunication companies, a need for a tool based on the exact negation of these characteristics seems useful and draws a line between service providers and selforganised groups of individuals.
MapOMatix is not real-time: every piece of information entered into the system can be located at a precise time on the time scale. MapOMatix, in this sense is a geo-wiki where the state of each map at a given moment can be recalled at any time, enabling people to visualize the state of a conflict or a territory at a given date, keeping the history and the memory of all actions performed through time. Used in this way, it also reveals itself as a tool for the collective memory.
MapOMatix does not guarantee any accuracy: the perception of events, place and space is relative to each individual, each one using her own subjectivity to describe her perception of territories. In some contexts (like repression against immigration floods in Morocco[8]), some
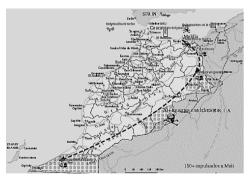
Efforts of Moroccan/Spanish authorities to close
the gates of Europe (10/10/2005)



Efforts of Moroccan/Spanish authorities to close
the gates of Europe (30/10/2005)

accuracy is needed, but this accuracy is left to the people uploading their information to the database. In some other context, like elaborating an abstract map of control structures or human organisations, geographical accuracy just doesn't make sense.

- MapOMatix is not centralized and does not apply any access restrictions to privileged users: The feed of information comes from the actors of the self-organized group, not from a centralized and privileged data feed. We would refuse to enter data automatically using a bridge to a centralized system (satellite or G.I.S. data).

- MapOMatix does not require any expensive technologies: Another refusal is to let mapping techniques in the hands of high-tech users, privileged holders of up-to-date gadgets. Every piece of data located on the map can be uploaded using the web interface, all other ways of providing data to the system (through GPS telephones, PDAs) would be easy to achieve but the need for it is still to be debated. From its inception and in the context where it was conceived (the border conflicts in the Straight of Gibraltar), the need for expensive technologies has always been perceived as a restriction of many existing systems.

- All these choices of implementation are based on a philosophy of bringing collaborative tools to social networks, all shareable and open-source. From the very beginning, all MapOMatix code is available on Source Forge: http://mapomatix.sf.net

- By many aspects, it is a continuation of former projects of free media hacktivists' groups, in that case of the al-jwarizmi versus CNN [9] and gollum/GISS projects. [10] MapOMatix is part of a wider project of free and uncontrolled tools for the multitude, one very important feature is that these tools can be entirely controlled by their users. They are built in a logic of nodes and networks, where there's no centralized database.

Horizontal networks versus stratified models.

The practice of collaboration draws patterns based on horizontal exchange. The incorporation of technology to such practice should consider the nature of these processes. All technological agencies contain an embedded narrative, a consumption model and in this sense should practitioners be conscious of such stratifying operations. Spotting geographical locations and targeting is the narrative of GPS, not so far from militaristic operations or other kinds of methods based on stratification, verticality, separation and distinction.

Our dreams hide from high-class location, we don't have expensive toys to make our games. We work against high class stratification and use our precarity just like 'precarias a la deriva', being precarious and drifting away until we land on more interesting land, based on a different logic than that of consumption.

1   Radio Frequency IDentification (RFID): http://en.wikipedia.org/wiki/RFID
2   A thorough landscape of psychogeographic reinventions from *«Context weblog»:* http://straddle3.net *How does your city affect you?:* http://straddle3.net/context/03/en/2005_11_04.html
3   For instance, Guy Debord, *The Naked City : Illustration de l'hypothèse des plaques tournantes en psychogéographique* in Asger Jorn, *«Pour la forme»,* Internationale Situationiste, Paris, 1958.
4   Henri Lefebvre, *«Writing on Cities»,* Social Science, 1995.
5   Nightmarruecos map made by indymedia estrecho: http://gollumlab.dyndns.org/mapomatix/cgi-bin/mapframe.pl?name=nightmarruecos
6   Molecules map, preliminary analysis of consumption molecules by elpueblodechina: http://gollumlab.dyndns.org/mapomatix/cgi-bin/mapframe.pl?name=molecule
7   AutonomiAerea map organised by http://www.rotorrr.org in Barcelona: http://gollumlab.dyndns.org/mapomatix/cgi-bin/mapframe.pl?name=alt-terrats
8   See ref.#5
9   Al-jwarizmi versus CNN: http://www.hackitectura.net/aljwarizmi/
10  Gollum/GISS: free media infrastructure: http://gollum.artefacte.org

**Towards a Permanently Temporary Software Art Factory**
**(Notes for the Sustainability of Software Artifacts)**
Javier Candeira

http://freesoftwareart.org

*Javier Candeira is issuing a call to arms, leaping into the role of evangelist for the packaging and distribution of free software art wish great energy. He offers three primary goals for this project. First, to allow and promote code sharing between artists and therefore increase their productivity. Second, to facilitate software art distribution of easily installed packages. Finally, to aid conservation of software artworks through community maintenance of these packages.*

*Candeira's vision is compelling, one of a community helping each another freely, sharing their work openly and preserving their work for future generations. Further, his arguments are persuasive, instilling a sense of urgency, artwork being lost to bad licenses and ineffective distribution mechanisms.*

*In the style of a FAQ list, Candeira goes through many possible objections to Free Software Art, particularly those potentially held by software artists themselves. This forms a tightly argued, combative piece, using forthright language of evangelists from the wider free software world to head off many potential counter–arguments before they can be made.*

*So while Candeira's work leads towards a project with clear aims and direction, it leaves a great deal of room for dialogue of greater breadth and subtlety. Many software art mantras, such as «release early, release often» simply may not apply to software art. Further,*

*not all artists are so interested in wide distribution of their work, or in other people being able to pick through their workings, and gentler encouragement and debate may be required before they join a free software community. Indeed we might consider many culture clashes between existing free software communities and the free software artist community that Candeira encourages here.*

*But even with these doubts and more on our minds, we must look on with hope that something of great interest and worth can come of such a project. Reading between the lines we understand that Candeira is working towards a software art orientated sub-distribution of the Debian linux distribution. We wish him well.*

<div align="right">Alex McLean</div>

*Abstract:*

Free Software has already proved to be a viable method for developing operating systems and business applications such as Debian GNU/Linux and the OpenOffice.org suite. This paper explains why Free Software has a great deal to offer to the practitioners of Software Art, and why releasing Software Art works under Free licenses will help in their production, distribution and conservation. Some of those benefits will be derived from the licensing process, and some from the subsequent packaging by Free Software distributions. Finally, frequently asked questions about this project are answered in an accessible manner.

**Free Software Art Manifesto**

Software Art does not belong in a museum vault, but in a working processor, wherever that processor is located. When the artwork is removed from physical artifacts, the question of accessibility ceases to be about the audience's access to the work, but about the work's access to the audience's processor.

In order to have access to its audience, the work must first be able to be run on a wide range of hardware; second, it must be able to find its audience; and finally it has to endure the passage of time, if by «audience» we don't merely mean «audience at the time the work is created».

Therefore, Software Artists are advised to ahere to the Free Software ethos and methodology of software development, which fulfills the three objectives of enabling Production, Distribution and Conservation of software artworks.

**Production**

Most artists dealing with technology find that their first hurdle is acquisition of technical know-how, and that they often can't find assistance outside their social circle. The communal development methods of Free Software provide Software Art practitioners with a technically-gifted community of peers and mentors.

Software Artists Ship Code

Code reuse is very important in software development, and therefore in Software Art. Artists want to express their worldview, not to reinvent the wheel. The use of Free Software allows code creators to reuse code more effectively, and to build upon the work of oth-

ers not only technically, but also artistically, in a time-honoured tradition both of old masters and modern movements.

Production of Software Art is not only a technical and artistic process, but also a legal and economic one. Institutions funding software works request the assurance that they will be able to show and distribute the work they commission . As more and more institutions demand full freedoms for the work they paid for, software artists can help  to fund their work by using Free Software both as their technical infrastructure and their licensing model.

Working with Free Software developers and the maintainers involved in its distributions will also help artists to navigate the sea of different Free Software licenses and to understand their implications.

### Distribution

These are terms that have been long understood by practitioners of more demotic arts, like the novel and cinema: as soon as access to the means of production is acquired, and the cost of building the work is met, there are three aspects to a reproducible work's success: distribution, distribution, and... distribution.

Obscurity Is An Artist's Worst Enemy

Licensing software artworks under Free licenses allows for their inclusion in Free Software distributions, or «distros», By making the artworks part of their automatically installable and upgrade-able repositories, distros allow any individual or institution to access the software programs for themselves or to present them to others.

The usage of free licenses is a legal guarantee of wider availability and diffusion: the technical possibility of diffusion and ease of installation is no guarantee if the works are limited by copyright law to particular geographical areas, social groups, or fields of endeavour.

The characteristics of availability of source code and its modifiability by third parties also help with distribution to other platforms: Free Software is often «translated» or «ported» to run on different hardware than the one originally used by the artist.

### Conservation

An actively maintained Free Software distro's repository is a living artifact, not a dead pile of code that once ran. Libraries are updated, and programs recompiled to adhere to new standards and run on new platforms, all without vendor troubles or time limitations.

#### Software Is A Process, Not A Product

The Free Software maintenance process solves the issue of conservation of Software Art works. Licensing software artworks under Free licenses allows for their inclusion in Free Software distros, thus making their conservation part of that process.

Software Art works require a physical substrate to survive, and that substrate, the computer, quickly becomes obsolete. A software artwork included in a Free Software distribution survives its original hardware and circumstances.

The fact that libraries are free to use without restriction also saves the work from vendor obsolescence as the work is not tied to proprietary code that ceases to be available if the vendor disappears or stops renewing their software licenses. Even in the case that one particular distribution stops being updated, all the code is still available to be picked up by another distribution.

Finally, the use of free licenses is also a guarantee of wider temporal availability and diffusion: works are no longer limited to the period of one exhibition by the owners of some of the assets, as free software is essentially available to everyone, forever. Free Software artworks do not have to wait until they lapse into the Public Domain for an enterprising curator to revive them .

**Free Software Art**

Individual artists like David Griffith (Fluxus), projects like the Open Art Network (The Great Game(boy)) and even loose networks of hacker-activists (Carnivore) are now freeing their code in order to fulfill the promise of sharedness and open access for the practice of Software Art. Some of their works are starting to seep into Free Software distributions, again thanks to individual efforts. These individual efforts need to progress into more coordinated ones, a «rough consensus and running code» metaproject of artists freeing their code and Free Software distribution maintainers packaging it for ease of access and conservation.

The Free Software Art movement does not yet exist as such, but its seeds are already in both communities, especially in the handful of individuals who inhabit the intersection of both cultures.

Free Software Art: it can either mean «Software Art whose code is Free», or an imperative call to «liberate Software Art» from obsolescence, obscurity and oblivion. Let's do it. Let's Free Software Art.

**Frequently Asked Questions about Free Software Art. Yes, people really ask this stuff!**

*How do I make a living if my code can be copied by anyone?*

The same way you make it now. If you think you can make more money by closely guarding your code so nobody can use it without permission, by all means dig your own hole of obscurity and irrelevance. It is a bloody lottery, and you may well be the next Toshio Iwai. But this is the real world, where there is only one Toshio Iwai, and most of us will never be published by Nintendo. The question boils down to what are your other choices.

This is the real world where 99,9% of software artists make a living by teaching, doing gigs at festivals, getting commissions

from museums and institutions if they are lucky, working for other artists (roboticists, old-school installation artists wanting to update their craft), writing code for commercial software companies, consulting for other type of businessess and waiting tables. In this world, getting your code to the higher number of people out there is the best way to make yourself a name and live on the ancillary benefits of public recognition. So if you want to make a living as an artist you would do well by promoting the distribution of your work by any means, including making your code Free for anyone to copy it, study it, use it in their own work.

*But won't everybody else then be able to make money off my code?*

Yes. Anybody will be able to teach with it, perform with it live, curate exhibitions in which it will be shown. And they will get money for that. And you won't get any of their money.

*But it's unfair!*

Well, put it this way: what would you rather have, 100% of a paltry earning, or 1% of a take more than 100 times bigger? The diffusion afforded by Free Software allows more people's work to achieve more relevance, and to collect a smaller share of a higher amount of returns from their work.

Let me give you an example using Processing, the Free software development tool for artists: Casey Reas and Ben Fry, the project's originators, get the sweetest gigs teaching Processing seminars. They are the ones who go to Ars Electronica and collect a Golden Nica, and also derive other benefits from their centrality to a Free Software project that is so important to the Software Art scene. Casey is writing the Processing book, and if there were two books most people would buy his. This is as fair as I can think. If what you are saying is that they should teach all the Processing seminars in the world and write all the books about Processing for all publishers, I don't think this would be fair for others, and it wouldn't be fair for them either.

*But then other people will retread my work by running my code, and my brilliance will become trite and cliched!*

That is as fair a question as you could have posed, and you are right. But it is also true that if you are succesful people will emulate you, copy you, and reduce you to cliche anyway. Seen this way, having your code out there might even raise the standard for emulators (people who emulate other people, not code that emulates other hardware platforms).

*But I don't want anyone to tweak my code a bit and claim it's theirs!*

The 19th Century called; it wants its novelists back. If you wanted a real answer, well, most Free Software licenses do not authorise anyone to say your code is theirs, as copyright notices must normally be maintained. Also, we live a world where hex editors exist and anyone can illegally modify any binary code and say it's theirs anyway without a Free License; bootleggers do it all the time with oldschool videogame ROMS. You are complaining about a problem that you might already have if you had shipped any code, and that this project doesn't do anything to worsen. Jeez!

*But people might think my work is bad because someone modified it but it still carries my name!*

Free Software licenses can and do include clauses stating non-endorsement by you of what other people do. There are conflicting opinions on whether licenses with clauses requiring that the changed binary has a different name are completely free, but code under such licenses are included in Free Software distributions such as Debian. And you can always publicly ridicule anyone who makes an ass of themselves by spoiling your precious code.

*Doesn't packaging modify the original artwork?*

It does and it doesn't. A Debian package contains your original source code in its original pristine form, and all the changes made by the packager are stored in separate files called patches. This way you, your users and art historians of the future can have the best of both worlds: integrity of the artwork and full compatibility of the binary.

*But my artwork depends on a very specific and unique piece of hardware!*

If your artwork is only true to itself if it runs on a unique and particular piece of hardware that cannot be reproduced, then it is an art installation, not software art according to our definition, it could never be packaged and distributed anyway, and you are reading the wrong FAQ.

And if that specific and unique piece of hardware is an old computer that most people can't have access to, maybe we can reproduce it under emulation, and have your Software Art work run on that emulator.

### A legal-technical intervention on the Political Economy of Software Art

*Doesn't emulation modify the original artwork?*

That is a bit of a conundrum for which I have two answers; and both of them are «no»:

a)  An emulator is something that stands in for hardware. The program can't tell a good emulator from the original hardware, and neither can the audience/user/operator. We all like vintage machines, but emulation is good for those who can't afford them, and what goes for videogames goes also for software art pieces.

b)  Software art pieces are like theater plays. Consider this metaphor: software is run the way theater plays are played. If the code is Shakespeare's Hamlet, it can be played on any hardware: Gibson+Zefirelli+cinematography, funny_guys+IRC, paper+your_brain, Ethan_Hawke+Bill_Murray+awesomeness, TheRoyalShakespeareCompany+a_theatre.

*What if a package is abandoned and ceases to be updated?*

An abandoned package can leave the work in a much better state than the original code, and never in a worse one. It contains the original code plus metadata about its conservation history in the form of changelogs and patches. Patches amount to decisions by a conservator, and some of those patches will incorporate

changes done for policy reasons, but some of them will be bugfixes in the original code or adaptations for later technology.

So even if your work is packaged today, maintained for fifty years and then abandoned, it will be in a much better state when the 2105 arrives and your school experiences a centenary revival.

*What if Debian( or Fedora/BSD/Whatever) ceases to exist?*

Allow me first to say that Debian or BSD can die, yes. But I can't envisage any scenario in which Debian or BSD can die without Free Software being made illegal and a worldwide Martial Law being established by hostile aliens from some dorky kid's imagination. Seriously, Debian, the *BSD and RedHat/Fedora will exist, in some form or another, for as long as Free Software exists. They might change names, splinter into derivatives or merge into the One True Distribution, but the goals of this project can be upheld as long as there is still one Free Software Distribution.

*What if Free Software is just a fad?*

Then Google and Amazon and Yahoo! will go away and disappear forever, and so will IMDB and most of the world DNS and HTTP servers, and most of the companies rendering FX for Hollywood films and.... If Free Software turns out to be a fad, the flying pigs covering the sun will give you enough food for thought that you will forget about your Software Art.

*What if Software Art is just a fad?*

I don't think software art will ever go away either. The label might, but generative art, experimental videogames and self-made performing tools are here to stay, among other sub-genres of what is now called Software Art.

I might be wrong too, and Sofware Art could well be, as the gentleman scholar who asked me this question feared, destined to wane as quickly as it has waxed. In that case its conservation is more needed than everything, and the distro-packaged Free Software Art works will be the best maintained collection of artifacts from this particular period in the history of art and tech.

## The 19th Century called;
### it wants its novelists back

*Isn't Runme.org already doing this?*

They are and they aren't. They invited me to give this talk, and write this paper, and paid my trip, my hotel and a fee. I am grateful of that, and that is a way for them to support the project. But then they aren't doing it themselves, because although the aims of a Free-Software-Art initiative overlap with their charter, the overlap is incomplete.

By their own commitment to the form, runme.org select and curate software art under all types of licenses, including non-distributed (just exhibited and performed) and undistributable works. Some of those are undistributable because they are not under free licenses, and some are because… they aren't even pieces of software as such. The promotion of Free Software among software artists is not their main priority: it is ours. Free-Software-Art is about software distributed under Free and Open Source licenses. It is about putting software artworks in Free Software distributions, and that is work that has to be done from inside the distributions themselves. Runme.org could serve as a bridge between artists and distros, but the packaging still has to be done.

*Isn't Jaromil/$name already doing this?*

Jaromil is already doing the first part of this: by releasing his own work under free licenses, he is making sure that his work is accepted into distributions such as Debian and Fedora, which will make his work more long-lasting, will help other creators learn and work from his code, and serves also as a great example.

The second part of the process, the systematic packaging of Software Art works inside distros, is something that is just too big for one person. A distribution is not only a CD you can install on your computer, or an online-accessible repository of all their programs.

It is also the process of co-ordinated communication and team-work amongst the thousands of maintainers and original program developers, a process that can survive any given individual's personal effort.

*Aren't institutional archives already doing this?*

No, they aren't. And they aren't at so many levels that this answer could easily be an article in its own right.

It is true that many institutions are starting archiving efforts, but merely archiving a software artwork is not the same as conserving it. An archived Software Art work is not running on a processor, it is merely stored in some mass storage media. It is resting, if not pining for the fjords. Geographical, technical, legal and economical hurdles preclude most people from access to those works, perfectly archived as they may be.

Even well-funded organisations face legal and economical challenges when trying to archive and make available the works they have the rights to. Access to these works for the world at large will still have to wait until they lapse into the Public Domain. We are mortals, and copyright terms nowadays are, by design, much longer than the average human's life. Archiving is not enough!.

*What will this accomplish for Art and Culture?*

Culture is that which is shared. Free Software encourages the spreading of ideas, the sharing of code and know-how, and the building on the base of other people's accomplishments.

Also remember that the practice of art is not just something artists do. Art historians and archivists also play a part, and Free Software Art allows them to keep the works alive in a usable state.

*Right, Free Software is good for society as a whole, but what will it accomplish for artists?*

Artists will accomplish more visibility for themselves by choosing Free licenses for their work. Free distributions will be able to package their work, and will do so either due to personal interest of individual developers, or with funding from museums and institutions.

Unless a software artists want to package their work themselves, packaging and funding is up to individual distro maintainers and curators. Artists can talk others into packaging their work into Free Software distributions as much as they can talk others into exhibiting their work: that hasn't changed much.

*Won't this perpetuate the existing models if funded projects can get their projects packaged by paying?*

Not really. Under the current model, funded artists get into museums and galleries, and their work gets out to people through their channels and the festival circuit. Unknown artists remain unknown unless they gain access to the insitutional scene and circuit. If artists release their work under Free licenses, it can get into Free Software distributions on equal footing with institutional-funded work. Free Software enhances the opportunities of experiencing all the Software Art in the world to a global audience, and the opportunities of having their work experienced by the world to all software artists.

Put it another way: although making Software Art Free won't reverse all inequalities, a world with a Free Software Art scene is a more level playing field for new, aspiring and unnafiliated artists than one in which there is no such scene.

### Archiving is not enough!

*Won't this get a lot of bad art/code into the archives or Free Software distro repositories?*

Probably. But bad art abounds anyway. The focus is in getting all art conserved so historians and scholars of the future will be able to understand software art. The purpose of a Free-Software-Art project is not to make a canon, or to select «good» art and have that preserved. The purpose is to allow all Software Art to get produced, distributed and conserved, and let Art History sort the good from the bad.

*Your examples are not the ones I would use! I know more canonical Software Art!*

Earlier drafts of this paper used the word «*canonical*» to refer to my examples (see Terms and Conventions). By «*canonical*» I never intended to mean «belonging to an artistic-historical Canon». I meant «standing for all that share the same characteristics». The main characteristic of the software packages listed, apart from their Software-Art-ness, is that they are under a Free license, and they do not depend on non-free code.

Many works of art could be released under a Free license but still not be freely distributable due to their dependence on non-Free code. Some of them (hacks on commercial games, works where the absence of source is part of the artistic statement) will never be distributable, and we can live with that. This does not mean we don't like them as artworks, just that we can't include them in our packaging effort.

*But Pure Data and Processing are not Software Art, they are tools!*
Agreed, but artists working with Free code need Free tools and freely-distributable runtimes too. Free Software Art is not a purely artistic project, but rather a legal-technical intervention on the Political Economy of Software Art. Thus Pure Data and Processing are included as «source code that will inevitably be part of Free Software Art works», although they are not works of Software Art per se.

*Why don't you do this project on Windows? I code on Windows! Linux is scary/difficult/not my cup of tea!*
This project is currently at the proposal stage, and it is being proposed on Free Software distros because they are the ones that allow people to do things like distribute livecds that contain whole Software Art collections in them, or deploy unexpensive machines in schools without paying expensive per-machine licenses for the Operating System.

As to you and your code, you don't have to do anything you don't want to. This is the beauty of Free Software: if you free your code

for whichever platform you work on, you will allow Linux people
to do the scary/difficult/not your cup of tea thing and port it to
Linux. Or the Mac, or whatever. It really is a win/win situation.

**Terms and conventions used in this paper:**
For the purpose of this paper,

**A Distribution** is both a codebase and the people who develop and
maintain it. A distribution project compiles a kernel (Linux,
BSD, Hurd, OpenSolaris) plus tools and userland applications
into an Operating System. This can be delivered in physical form
(in CD form) or online, through special servers called reposito-
ries. Debian, Red Hat, and FreeBSD are all Free Software distri-
butions according to this definition.

**Free Software** is that which can be freely used, copied, modified, and
distributed in unchanged or modified form. Free here means
«libre», not «gratis»: hence Free Software can be sold and still be
Free as in free speech, although maybe not free as in free beer.
The requisite of modificability of Free Software requires for its
source code to be available. This is why some people prefer to call
it by the name Open Source Software.

**Free Software** and Open Source are, outside very extreme edge cases,
functional synonyms, as there are virtually no Open Source pro-
grams that are not Free according to either Debian or the Free
Software Foundation, and there are hardly any Free Software
programs that are not Open Source. I use «Free Software» or
«Software Libre» throughout, but if you want to use «Open
Source», it is mostly ok, as long as you mean Open Source to
carry the connotations of «free to modify and distribute» as well
as «has available source code».

**Software Art** is whatever you want to make of it, but for the purpose
of this paper and for Software Art packaging efforts, «software
art»means «code that compiles into aesthetic objects, into artistic

performance tools, or into tools specifically designed and pro-
moted for artists  creating the previous two categories». Free-
Software-Art is a software  packaging effort, so it deals with soft-
ware which can be distributed and run  on generic hardware.

What is and is not Software Art is fuzzy, as many categories are not
binary, but rather points in a continuum. The following examples
stake out some territory of Software Art by using examples
whose licenses are free and depend only on free code:

| *Category* | *Example* |
|---|---|
| Standalone applications | Electric Sheep (distributed generative screensaver) |
| Client-server applications | Carnivore (online surveillance tool) |
| Performance instruments | Fluxus (scheme-based GPL visuals livecoding tool) |
| Art games and game mods | Rrootage, Transcend, Fijuu |
| Coding Platforms * | Processing, Pure Data (code that compiles into aesthetic objects) |
| Social Web Services | Everything2 |

**Packaging** means preparing a composite of a program's compiled
binary (or its data) plus the appropiate metadata in a format that
can be automatically installed by an operating system. As our
project is about, we will talk about packaging for Free Software
distributions such as GNU/Linux, the BSD family, OpenVMS
or your own homecrafted one. Red hat .rpm files are packages,
and so are Debian .deb files. BSD packages are called ports, but
for the purpose of this talk they are also packages, and the process
of making a raw source code tarball into a port will be called
«packaging».

* Not Software Art per se; included as coding platforms specifically designed
for and aimed at Software Artists

1    Julian Oliver aka Delire, the factotum of Art Gaming website Selectparks.net, has this to say about Free Software as an enabler for software artists: *«artists wanting to sell work to museums and/or have work shown in museums/galleries have hit a legal 'glass ceiling' due to the issue of IP»*. http://games.slashdot.org/comments.pl?sid=158904&cid=13310740

2    Or try to fruitlessly in the absence of source code.

3    At Ars Electronica 2005, during the Digital Archives Conference, the representative from Medienkunstnetz.de Rudolf Frieling talked about their project having taken *«3 years, which is not long if you take into account the copyright issues»*, and Matt Locke, from the BBC archive, said that their project had taken *«2 years because of negotiations with rightholders»*.

**LYCAY (Let Your Code plAY)**
Ilia Malinovsky

Ilia Malinovsky's «LYCAY — Let Your Code plAY» generates music from software source code. It can be used by programmers to «hear» their code while they are developing it.

What LYCAY is not:

LYCAY is not data sonification (it makes music from algorithms – i.e. processes — not just static data). It is also not livecoding[1], as Malinovsky himself points out. In livecoding, as in other forms of software-based composition, code outputs music when it executes. In LYCAY, code causes a specific result independent of its output when executed; in fact, the code need not be executed at all.[2] LYCAY also differs from livecoding in that it does not have any requirement to be performed live. LYCAY can be used with source code for any type of application; the application itself need not be music-related.

What LYCAY is:

LYCAY is metaphor. LYCAY makes concrete the metaphorical thought processes that many programmers find themselves having about their code when they get «into a groove» as they work. Some programmers begin to think about their algorithms visually – as, for instance, a dance or an animation. LYCAY depicts them sonically. This seems a reasonable choice, since traditional musical phrases have a lot in common with programming algorithms. For example, a musical phrase is often «looped;» a musical theme and variations could be thought of as a subroutine executed multiple times with

*varying parameters. One can imagine listening to LYCAY rendi-*
*tions of various pieces of code written by the same author. We would*
*begin to «hear» a programmer's style.*

*LYCAY is a work under continued development, and the results at the*
*momentcan be a bit confusing. What's interesting though is the*
*emerging character of the output. On the one hand, LYCAY's music*
*certainly exhibits elements of stereotypical «random» sounding*
*atonal computer generated compositions. On the other, there's some-*
*thing strangely human sounding about it: there are moments of*
*tension build-up, frantic acceleration, then release. Software code is*
*human expression, but its primary «audience» is still the processor.*
*Perhaps if LYCAY's musical expression of code sounded more like*
*human music it would be dishonest.*

<div align="center">

Amy Alexander

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Rhythm and music are the earliest and most natural forms of
human self-expression; they are also methods of transmission and
perception of information. Rhythm and music act not only on the
level of consciousness, but also on the one of subconsciousness,
creating images. Programming as a kind of art is a process of oper-
ating with pure semantic forms, which means the highest level of
involvement of consciousness into the creative act.

The main idea of LYCAY project is to use musical accompaniment
during programming. This accompaniment corresponds to the
meaning of the program so it allows the programmer to look at
code in some different ways than usually. Working with music

1    Livecoding is an audiovisual performance practice in which software that generates
     music or visuals is written or modified onstage as part of the performance.
     See http://toplap.org.
2    One can imagine creating a piece of software whose output when executed is music
     identical to its LYCAY output -it might be an interesting new form of quine. (A quine
     is a computer program whose output is its own source code. Programmers typically
     write quines for amusement and challenge.)

corresponding to the code, programmers will be able to look at the code and algorithms they are creating differently: using not only their consciousness but subconsciousness as well. Thus, programmers will be able to see more accurate and complete picture of what they create, to involve all their feelings into the process of creation, to use their consciousness and subconsciousness. Programmers will be able to open their mind and create something they could never imagine before.

Aesthetic beauty of code will be expressed in music: if the programming code has aesthetic beauty then the music of this code should also sound nice.

The meaning of the program is determined by the flow of instructions and data during runtime of the program. This flow depends on possible values of input parameters so the meaning of the program is determined by execution of the program for all possible values of input parameters.

Programmers are also able to understand the meaning of the program even if they do not mentally interpret/calculate this program for all possible values of all parameters. Moreover, they have some kind of intuitive feeling of the program. To make this intuition clear LYCAY was created.

I use the following mathematical formalisms in LYCAY. Any programming language is organized by its formal grammar. The meaning of the formal grammar is a system of functions dependent on the language's grammatical rules and atomic rules (i.e. concrete expressions: variable names, variable values and so on). If there are ways to make all grammar rules sound, then the sound of each rule corresponds to the meaning of this rule, so the sound of the whole program corresponds to the meaning of the program too.

The representation of the program in music is achieved by translation of grammatical rules of a programming language (I use java)
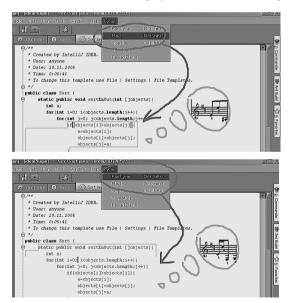
into the musical phrases. The music itself is generated by JMusic[1] that was developed by Andrew Sorensen and Andrew Brown.

LYCAY is designed like IDEA's plugin (IDEA[2] is a very popular integrated development environment for Java and it provides a lot of simple ways to work with code such as parser and so on) so there are many possibilities to extend functionality of LYCAY. For each grammatical rule of java's grammar a user can set any arbitrary algorithm that will make this rule sound the way he/she designs. This algorithm is also written in Java. A simple example: each note can depend on the previous one, each rule can influence its sub-rules, etc.

LYCAY plays music realtime, simultaneously highlighting the played line of code. Thus, LYCAY determines what to play, plays it and highlights what it is playing.

There are some features that are implemented in the current version: One can play any logically correct part of code. By «logically correct part» I mean a part that corresponds to some grammatical rule. LYCAY determines the complete grammatical rule that corresponds to the position of the cursor and plays it.

For example, one can play an equality operation, a loop or a conditional operator (*first screenshot*). One can play a whole Java method or/and save music as midi file (*second screenshot*).

When LYCAY is playing music one can hear two soundtracks. The first is generated during the grammatical parsing of code. It is achieved by mapping grammatical rules to music. So when the first track is playing one can establish a correspondence between a rule and sound.

The second track is generated by the flow of lexemes[3] of code. Thus there's established a correspondence between the concrete text of code and music. It is achieved by mapping lexemes to music.

So there are two kinds of connections between code and music, and, therefore, the subconsciousness.

I would like to mark a difference between this approach and livecoding.[4] Although they seem very similar as they use similar concepts: code and music, that somehow depends on the code, there is a very important and principal difference. This difference can be described as follows.

In livecoding one start with writing musical operators that will play. When an algorithm is written, it starts working — calculating, and this calculation is translated into music that is played. Livecoding sets the process of calculation and in this process there is music played; music reflects calculation, and calculation influences the music.

LYCAY generates meta-music: it doesn't calculate the algorithm, the music of which we would like to get. LYCAY looks at the algorithm from above, and plays it without calculating it. Thus, if

livecoding is a thing-in-itself, and can only be used while programming for generating particular music; LYCAY can be used while programming anything with the given language. The correlation between these two approaches is an interesting question to investigate.

To start LYCAY, you need to have IDEA 5.0. Copy the file lycay_#####.jar into the plugins folder (it is where you have installed IDEA, for instance, C:\Program Files\JetBrains\IntelliJ IDEA 5.0\plugins). Start IDEA and LYCAY will start automatically.

Documentation on LYCAY's architecture and instructions on programming in LYCAY are available at: ttp://lycay.sourceforge.net All necessary files could also be found there.

The requirements: Java 1.5, IDEA 5.0 (build since 3461)

1    http://jmusic.ci.qut.edu.au/
2    http://www.jetbrains.com/idea/
3    'Lexeme' is used here to refer to the symbols of code; physical concrete numbers or names; data — as opposed to the grammatical elements of code.
4    A. Alexander, N. Collins, D. Griffiths, A. McLean, F. Olofsson, J. Rohrhuber, A.Ward *Live Algorithm Programming and a Temporary Organisation for Its Promotion* http://runme.org/project/+livecoding/

**aPpRoPiRaTe!**

SVEN KOENIG

>   *Sven Koenig's work matches Misuse of Technology category best.
>   He reveals what developers of existing video compression tools do
>   their best to hide.  Usually a compressed video looks almost the same
>   as the original one, but its structure is very different. Just dig a bit
>   deeper into it, and instead of a firm file construction you will see a
>   shaky structure that immediately falls apart, but beautifully, artis-
>   tically!  Many had witnessed this beauty when downloading bro-
>   ken encoded videos from the net and playing them back, but only
>   Sven Koenig got an insight to reveal it as art. The content of the
>   original video becomes important here, but only as a source for the
>   'broken' one, that is why one can put aPpRoPiRaTe! in both
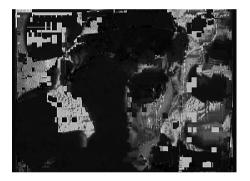>   Appropriation and Data Transformation categories.*

*The output of  Sven's software looks like a hypnotic flow of semi-recog-
nizable images of strange colours and with big pixels sometimes, so
we cannot escape relating it to our Glitch and Psychedelics experi-
ences. The aesthetics of the aPpRoPiRaTe! is unquestionably of the
digital, computer nature; and the output is pretty striking as it
clashes this «cold», glitchy, dysfunctional beauty of revealed compres-
sion algorithms with a «sweet», seductive and glamour one of the
original videos, which are mainly ripped-off Hollywood movies
and MTV videos  — most common content on P2P networks.*

*For sure, the project contributes to the theme of overproduction in the
media sphere or Data Pollution; — visual data becomes important
not as such, because of its content, but as a raw material for further*

*production. In this sense aPpRoPiRaTe! parasites, pirates on the
commercial products and would not be possible without them. This,
on one hand, puts the project and its author in a marginal position
and confronts with the mainstream media production world, but
on the other hand, protects them from this all-mighty opponent,
making «re-Appropiration» practically impossible.*

<div align="right">

Alexei Shulgin

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## The initial proposal



### What?

APpRoPiRaTe! is an attempt to appropriate movies found in
file-sharing networks and turn them into art by revealing the real
nature of such video files. To achieve that a software for simple
file manipulations has to be written. This software's aim is to
hack a found video file by just changing the structure of the file to
turn it into something visually completely different without any
video processing.

### Why?

As soon as a movie, either as a dvdrip or a camrip is fed into a P2P
network it's changing its nature from being a product of the film

industry to being a collaborative work that has undergone several transformations. First it was intentionally ripped and second encoded using software that applied complex mathematical transformations to the data. A downloaded movie file is the sum of the [>1] original film, [>2] the work of the mathematicians who laid the theoretical foundations for [>3] the programmers who designed the encoding software / the codec and [>4] the ripper / spreader who finally uses all that software to intentionally make the [>5] movie widely available. [2]—[4] usually stay invisible in that process leading to the wrong assumption that [1] == [5]. That's the logic copyright infringement argumentations build on. Apart from the fact, that copyright is wrong anyway [>6] aPpRoPiRaTe! is used to turn [5] into something I declare [>7] art which (clearly) ≠ [1].

**How?**

For lossy video compression several techniques to save space are applied. The one I want to exploit is that of delta frames. An encoded movie doesn't contain all full frames but only a few of them (key frames)—the rest of the frames are just saved as the

difference between different frames. Any frame that is not a key frame is calculated out of the last key frame and all following delta frames. By simply manipulating / deleting the key frames of a movie file it's easily possible to transmogrify that file with minimal effort. Such a manipulation is technically just copying of data just a little different from how it usually would be done — but it reveals the nature of found movie files as collaborative works. Digital video compression is considered working the better the less its effects are visible. My interest is to reveal the aes-



thetics of the mathematical techniques and data manipulations and make them visible. The results are not just digital video glitches but beautiful surreal morphs and transformations I haven't seen that way before. Any compressed movie off the net already contains numerous hidden submovies that want to be discovered. The effects are not just signs for it's digital but for off the net.

The technical aspect of the idea is inspired by a bug I've encountered in a media player when testing downloaded movie files.

**Bug**

I was thinking about how video files from p2p-networks could be appropriated in an as simple as possible manner with an representation as aesthetic as possible. I had lot of ideas but none of those ideas was near as good as the one I've found by accident when I've watched an episode of the 80's series The Fall Guy (that I've downloaded for another project) with a VLC Media Player. A bug in the videoplayer caused the video to play improperly.

Here one of the frames from the original video played w/ the buggy video player that I liked most:



This effect appears, when one jumps from a scene with an explosion to a scene where the hollywood hills were shown slowly zooming out. Just a day or two before I was listening to an old hip-hop mix containing the track Burn Hollywood Burn by Public Enemy. That's one of my favourite early 90's hip-hop tracks so maybe that's why I like that picture.

So the video player's bug became the central feature of aPpRoPiRaTe! The term «it's not a bug, it's a feature» yields around 100.000 hits on Google, btw. As I'm not using any code from VLC I'm of course not using the very same bug. And I haven't analyzed the VLC Code to

find out how the visual effect was generated. I knew how video compression worked before, so I could interpret the visual effect caused by the bug to know what happens.
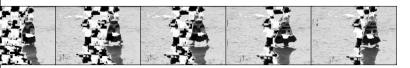
After the presentation at README 100 (as you may remember...) and a later presentation in Zurich both times a member of the audience insisted that he has seen that bug before and that my project was too easy to do to (to be art, I guess). And I've heard from 3 more people until now that they've seen that effect when playing downloaded files. And of course to programmers of video software this effect is known but not desired. Here's a quote from the author of pymedia, a video player- framework for python: «However I must tell that you cannot simply «jump» to a frame of your choice. You always have to jump to a key frame (I-Frame) and start decoding from there.»

Another statement which provoked surprisingly upset reactions was that I said that I don't care at all how the effects are generated in detail and that if someone really needs to know it he should read the mpeg4 specifications.

Data can be processed in many different ways, everything can be transformed into anything else and especially in Generative Arts can be seen that a lot of artists prefer to waste vast amounts of time to code very complicated programs to yield effects which are meaningless instead of asking themselves what certain data and software and it's effects as social artefacts actually mean.

The bug is an object trouvee even in the very classic sense of the word, as it can be found only once (it's in a way singular and discrete) to make it central functional part of the project.

Below is the source code of the function containing the bug. That textual representation is of course meaningless until this code as part of a bigger program is run to transform some data in a way that it's becoming meaningful.

```
    *****************************************************************
    Return VLC_TRUE if it's a key frame
    *****************************************************************
    static int AVI_GetKeyFlag( vlc_fourcc_t i_fourcc, uint8_t *p_byte
    )
    {
        switch( i_fourcc )
        {
            case FOURCC_DIV1:
                /* we have:
                 *  startcode:      0x00000100   32bits
                 *  framenumber     ?             5bits
                 *  piture type     0(I),1(P)     2bits
                 */
                if( GetDWBE( p_byte ) != 0x00000100 )
                {
                    /* it's not an msmpeg1 stream, strange...*/
                    return AVIIF_KEYFRAME;
                }
                return p_byte[4] & 0x06 ? 0 : AVIIF_KEYFRAME;

            case FOURCC_DIV2:
            case FOURCC_DIV3:   /* wmv1 also */
                /* we have
                 *  picture type    0(I),1(P)     2bits
                 */
                return p_byte[0] & 0xC0 ? 0 : AVIIF_KEYFRAME;
            case FOURCC_mp4v:
                /* we should find first occurrence of 0x000001b6
    (32bits)
                 *  startcode:      0x000001b6   32bits
                 *  piture type     0(I),1(P)     2bits
                 */
                if( GetDWBE( p_byte ) != 0x000001b6 )
                {
                    /* not true , need to find the first VOP header
    */
                    return AVIIF_KEYFRAME;
                }
                return p_byte[4] & 0xC0 ? 0 : AVIIF_KEYFRAME;

            default:
                /* I can't do it, so say yes */
                return AVIIF_KEYFRAME;
        }
    }
```

**System Stories and Model Worlds:**
**A Critical Approach**
**To Generative Art**
MITCHELL WHITELAW

*In his article «System Stories and Model Worlds: A Critical*
*Approach To Generative Art» Mitchell Whitelaw Canberra(AUS)*
*proposes to bridge what has been detected by various authors, the*
*unproductive gap between «software formalism» and «software*
*culturalism». While formalism tends to be visually abstract, and*
*thus corresponds to the field of generative art, the culturalist*
*approach, on the other side, suggests that software art is predomi-*
*nantly critical/political, focusing on and deconstructing software*
*as cultural text. Refusing what he calls binary thinking, Mitchell*
*Whitelaw instead proposes to overcome this split by calling for a*
*«critical generativity». Such an approach would deconstruct the*
*system stories contained in the formal objects used by generative art*
*and thus would critically analyze their implications. To put it*
*shortly, it would allow to «read generative software art according*
*to the critical paradigm of the software culturalists» (Whitelaw).*
*But how exactly are these system stories to be deconstructed? Whitelaw*
*hopes to find examples for «critical generativity» by analyzing gen-*
*erative artworks by Reas, Tarbell, Ngan, Capozzo, Masuda,*
*Annunziato, Driessen and Verstappen (all of them, by the way,*
*male artists). By asking what kind of narrative these projects con-*
*vey, Whitelaw formulates poignant comments on generative art's,*
*hm, let's call it basic level of imagination (paragraphs 2 and 3): «a*

*clone in a crowd, unchanging, with no traction on the space it inhabits, existing in an ongoing, perpetual present.» And he continues, criticizing the image of contemporary society that's being provided as naive and utopian: «a mass of identical (or typed) individuals, each contributing equally to the collective dynamic, each equally connected with and affecting all the others.»*

*That's not what interests Mitchell Whitelaw. Instead, he is looking for «critical generativity»: Systems that sketch «possible worlds», imaginations of the systems we live in, revolutions cast in software so to speak. As generative art's basic material are systems themselves, Whitelaw predicts a «unique potential» for generative art: «unlike other forms of discourse, it can actually experiment with the emergent outcomes of particular ontologies, modes of being and relation.» Rather than reproducing known features and merely feeding these known features into «eye-candy machines» (as most generative art projects do, according to the author), he calls for prospective or utopian potential of generative ontologies that «might equally be ironic, critical, deconstructive or fantastic». Golan Levin's Axis applet is cited as an example: «Generative art can, and must, do more than make images of complex systems; it can tinker critically with the systems themselves, then set them running: possible worlds.»*

*Whitelaw's suggestion to read the implicit system stories and to decode the narratives and ontologies inherent in the systems employed in generative art is extremely interesting. It shows that the performativity of the program code is embedded in a system story, and that this system story or ontology is a text that is at the same time narrative, performative and prescriptive. However, Whitelaw's approach doesn't seem to be radical enough. Isn't the boringness of generative art projects all the more revealing in terms of uncovering system narratives contained within today's economic or a-life models than generative art projects that produce «possible worlds» as alternatives to the existing one and its narratives? In bringing*

*forth «possible worlds», wouldn't «critically generative» art projects rather conceal the system stories already at work in our contemporary world than uncover these narratives? And isn't Mitchell Whitelaw's counting on «critical generativity» (i.e. generative art producing alternatives to existing system stories) falling into the same trap of expecting generative art to produce the «unknown» or unexpected? Wouldn't this unexpected system story have to remain per se system immanent — precisely because the solutions it offers are software based?*

*Mitchell Whitelaw's postulation of «critical generativity» yet waits to be met by corresponding generative art projects. In the discussion following Mitchell's remote presentation it was suggested that one of the first projects that could be called «critically generative» possibly is Renate Wieser and Julian Rohrhuber's project «Invisible Hand Machine» realised for Readme100 (2005).*

<div align="right">Inke Arns</div>

## 1. Introduction

Writing in 2002, Florian Cramer draws a fundamental distinction in software art practice, between «software formalism» and «software culturalism.»[1] The former focuses on the generativity of code; the latter on software as a cultural text. Formalism is typically visually abstract, and focuses on the processual relations of coding and aesthetic output; culturalism is critical, discursive and reflexive, deconstructing the «mind control» techniques of software. For Cramer this split in software art practice is troublesome because neither approach, individually, seems promising. More recently, Troels Degn Johansson has taken up this split, pessimistically labelling it the «no future» of software art.[2] Inke Arns clearly announces the same distinction: «generative art ≠ software art.»[3]

Based on current practice, it seems that this split is persistent. If there has been a recent shift in the balance, it has been towards

the abstract, formal or generative approach; a sign of its currency is that one of its favoured tools, Casey Reas and Ben Fry's *Processing*, won a Golden Nica at the 2005 Prix Ars Electronica. Here I want to set out a critique that focuses on abstract generative works, while ultimately attempting to overcome the split diagnosed by Cramer and Johansson, and the «no future» it implies. Instead the future for software art practice could lie in }a fusion of formalism and culturalism: what we might think of as a critical generativity.

Another way to position this argument is in terms of abstraction and complexity. For Lev Manovich, contemporary generative art is distinctively concerned with complexity, unlike the paradigm of reduction that characterised abstraction in the visual arts in the first half of the twentieth century. Here, following a scientific paradigm shift, the visual arts pursue *«new types of representations adequate to the needs of a global information society, characterised by … new levels of complexity».*[4] Yet Manovich goes on:

*This still leaves open the question of representing the new social complexity symbolically. While software abstraction usually makes more direct references to the physical and biological than the social, it maybe also appropriate to think of many works in this paradigm as such symbolic representations. For they seem to quite accurately and at the same time poetically capture our new image of the world — world as the dynamic networks of relations, oscillating between order and disorder — always vulnerable ready to change with a single click of the user.*

This paper proposes another possible answer to the initial question, of how we might represent our «new social complexity.» Software art does, as Manovich recognises, have a particular ability to address that situation, because it adopts complex (formal) systems as a basic generative tool. As such it can present not only an «image» of our situation, but more powerfully, a systemic abstraction, a model.

## 2. A Critical Approach: System Stories

So far the discourse around software and generative art has focused largely on defining and contextualising the field, and reflecting on its particular processes and materials—for example the nature of «code»,[5] or the question of software / process as art.[6] In order to come to grips with the works themselves, I would argue that any critique must be able to address the specifics of their generative systems; that the systems, not their outputs or residues, are the core of the work. System can be distinguished from code: code is the language-specific text that implements the abstract, formal structure that I will call system. So a code-literate reader can interpret system from code, but systems can also be described in other forms, either «natural» or other languages.

Software art systems are concrete collections of objects, relations, actions and processes. In part they are formal but constructed ontologies, describing entities and their interrelations. These ontologies are partly metaphorical or figurative—constructing for example «agents» in an «environment.» They are also partly technical / textual, in the sense that the implementation of these figures occurs within the structures of a formal language with particular representational and computational limits.

How do we read such systems, critically? They are literally texts, in their source code, but also in a critical sense, in that they involve specific figurations, relations, decisions, values and ideologies. We can draw on the ways critics from the humanities have approached similar systems, from artificial life. Stefan Helmreich[7] and Katherine Hayles[8] have made strong analyses of a-life science, pursuing a basically deconstructive approach and arguing that a-life systems are fundamentally narrative in their operation. Moreover for these critics a-life's narratives themselves «re-inscribe» particular assumptions about embodiment, subjectivity, gender, family and theology. These narratives are

decoded in part from the discourse around the software system—Hayles for example makes use of a video representing Tom Ray's *Tierra* system, where Ray's biological and theological analogies are spelled out in the narration and the construction of the visualisation. However when Stefan Helmreich analyses John Holland's Echo, a platform for creating agent-based a-life simulations, he does so based on conversations with a programmer and inspection of the code; Helmreich's observations come as much from the defined formal structures of the software, as they do from the discourse around those structures. These analyses suggest a way of reading systems as stories; they in turn create new, critical stories based on that interpretation.

So, a «system story» is a translation or narration of the processual structures, ontology, entities and relations in a software system. Such stories are useful devices for opening up these systems to discussion and critique. System stories are not singular or objective; each one is a particular and situated reading. Nor are they floating signifiers though, since they draw on the concrete, formal object that is the software system. What generative art criticism needs are system stories that engage, in detail, with that formal object, and draw out its implications.

Hayles and Helmreich also provide an argument as to the importance of system stories. In their analyses, the narratives of artificial life are tacit, built-in assumptions which inform software models and simulations. In the case of a-life, there is an obvious relationship with the world «outside» the simulation—with life as we know and live it. The critics warn us against mistaking these assumptions for «the rules» of life—confusing the made with the given, or culture with nature. Similarly the value of system stories for generative art is in their ability to connect—critically, prospectively, speculatively—entities and relations within the system, with entities and relations outside it.

A cultural critique of software art systems is the bridge spanning Cramer's formalist / culturalist duality. It seems to offer a way to read generative software art according to the critical paradigm of the software culturalists. Yet how can this approach be compatible with the paradigm of abstraction that characterises this work? As Manovich has shown, abstraction is recognised as a hallmark of contemporary generative art; for Brad Borevitz this software has been uncoupled from instrumentality or referentiality—it «*serves nothing save its own play, display and critique.*» [9] Even when it uses the modality of simulation, its «*simulations … may refer only generally to real-world physics, since they borrow the formulations of Newtonian rule merely to abstract them and play with them according to the demands of an aesthetic production…*» My argument is complementary, but not contradictory, to Borevitz. Simulation techniques are used in these works as generative devices, not as tools for modelling; but nonetheless the work is entirely shaped by the construction of its underlying system, its configuration of entities and relations. That configuration, what Borevitz calls its «logic» or «systemacity,» is revealed to the user through a process of dynamic interaction; as Borevitz says there is a kind of experiential reverse-engineering at play, as we map back from residue or output to system. Once again however, the system is core, and therefore surely the structure of that system is crucial. Especially in works using simulation and related techniques, abstract generative art performs *cosmogeny*: it brings forth a whole artificial world, saying, *here is my world*, and *here's how it works*. Once again, I will argue that this practice is in a unique position to explore and critique «how it works.» Borevitz quotes Greenberg on abstract painting and sculpture: «like functional architecture and the machine, they *look* what they *do.*» So, what do they do?

### 3. System Stories: Some Examples

Engaged as it is in the pragmatics of generativity—of making something make something—generative software art turns to computationally expedient techniques. The simplest of these is combinatorics or the playing out of permutations. Some recent visual generative art follows this approach, setting a simple system in motion and observing its outcomes. The results are visually complex, but the underlying system is surprisingly simple, as in some of the pieces in Casey Reas' *Software {Structures}*: Reas' *#002* and *#003*, Tarbell's *#003A* and *#003B*, and Ngan's *#003B*.[10] In this project the artist's focus was was reflexive and processual: considering the «natural language» specification of a structure, and its varied implementation. Removed from that context, however, we are faced once again with the shape of the system, and the question of interpreting, or responding to that configuration of entities and relations. The model worlds in these instances are pure machines, clockwork constellations. They transform determinism into aesthetic complexity using scale of population and a kind of analytic or integrative visualisation—displaying spatiotemporal relations rather than the entities themselves. What is extraordinary here are the forms and patterns generated by that derived visualisation: deterministic but impossible to predict, as if the LeWitt-inspired procedural structure was being viewed through some strange high-dimensional lens (see especially Tarbell's *#003B*). Yet the underlying systems themselves are crystalline and impervious, and this character underpins our experience of these works.

*Software {Structures}* also shows examples of another common world-system, using techniques of physical simulation. Hodgin's implementations of *#003*, and Ngan's *#003A*, both introduce simulations of momentum and gravity (disobeying the «structure» in the process). Among the many other uses of this technique are
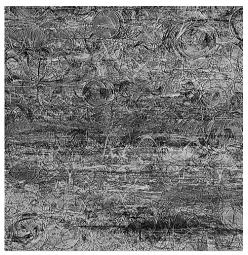
Mark Napier[11] and Scott Snibbe's[12] works in the CODeDOC project. These techniques are pragmatic and effective, in generative terms: they create complex, dynamic interactions between elements, at a low computational cost. They also bring with them an immediate physical resonance, as we recognise these physical dynamics and infer the properties of the entities (their relative masses, the strength of gravity). As Borevitz says these techniques are generative, but they are also inherently narrative and metaphorical, they create model worlds and characteristic patterns of relations. It's striking to observe how a strictly physical simulation provides a basis for the artists' organic and even social analogies: Ngan writes of trying to imbue a «sense of life» into the entities in his beautiful *#003A*; Hodgin describes the results as «organic» and «cellular»; Tarbell goes further, imagining the circle entities «experiencing» and «choosing» intersections, «analogous to daily life.»[13] This critique is not intended to discourage or overinterpret these narratives, but rather to imagine the consequences of taking them more seriously, especially in their potential relationship with the «outside» world.
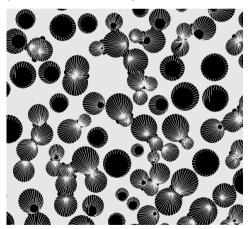
This unfulfilled potential is especially clear in the way generative art uses multi-agent systems. In this ubiquitous technique, entities are explicitly defined and visualised, often literally traced as they move around a cosmos/canvas. Their relations with each other can be more complex than in a physical simulation, including «flocking» behaviour, where individuals modify their motion based on that of their neighbours (see for example Alessandro Capozzo's *Relations* series[14]). Casey Reas has used this technique extensively, in systems including *Tissue*, *Microimage*, *Articulate*, *TI* and *Cells.*[15] Reas' systems show the organic multiplicity of the flock, but also add mobile «attractors» that draw in swarming elements.

Here too, the generative technique is effective in creating visual complexity, and emergent dynamic form; but again each multi-agent

Jared Tarbell, Structure#003B



William Ngan, Structure #003A

system encodes an ontology, a structure of entities and relations, which must be read as the core of the work. The entities themselves have characteristic properties: they are identical, or belong to a set of pre-defined types, and their properties and behaviour are static over time. The systems have a particular relation to time: they tend to be a series of instantaneous slices. The state of the system at one moment is a function of its state in the moment just passed (this is also true of physical simulations). In other words, history is all but absent. This is reflected in the construction of «agent» and «environment» in these systems. The environment here is (literally) a blank canvas, inert, empty space. Agents tend not to have a means of influencing that environment —even when they leave «traces» in that space, the traces have no impact on the agents. The traces are visualisation devices, not entities in the formal ontology. What kind of narrative is this? All these attributes can be explained as computationally pragmatic—the simplest or most efficient way to achieve the generative payoff of the swarm aesthetic. Again any referentiality of this system can be downplayed in favour or pure generative instrumentality. And again I would argue that in fact these works are fundamentally determined by this ontology, and that in a basic way we *see* it in the works (cf. Greenberg, above). The works visualise their structure of entities and relations. They model a world.

My concern is not for realism or to oppose the necessary abstraction that any simulation or agent-based system involves. Rather it is to point out that these systems encode, for whatever reason, specific ontologies, and that those ontologies in turn, especially in agent-based systems, present specific attributes: modes of being and relation, relationships between individual and group, morphology of groups, relations of individual and environment, models of being-in-time. Manovich sees in such work an image of «world as the dynamic networks of relations, oscillating

between order and disorder—always vulnerable ready to change with a single click of the user.» This is true, the swarm aesthetic is enchanted with dynamic multiplicity, with shifting networks of relation, with coalescence and dispersal. But consider the subject or agent modelled here, if that's the story we want to tell: a clone in a crowd, unchanging, with no traction on the space it inhabits, existing in an ongoing, perpetual present. If these systems provide images of contemporary society then they are, at best, naïve and utopian: a mass of identical (or typed) individuals, each contributing equally to the collective dynamic, each equally connected with and affecting all the others. As a social model this is a kind of idealised, frozen anarcho-democracy, where power relations (unequal causal connections) can never emerge.

## 4. Possible Worlds

This critique is simply a starting point; its flipside is more positive and important. If generative software art communicates system stories, particularly in the form of model worlds or ontologies, then it is potentially a platform for telling system stories that are more sophisticated, critical or experimental; it could take seriously the prospect that Manovich proposes, the potential of software and generative technique to provide images of, or rather *imaginations of*, the (social, cultural, personal, material…) systems we live in. Generative art has a unique potential here, because unlike other art forms its basic materials are systems themselves.

I will use a handful of works here to illustrate this (mostly unstated) potential as it appears in contemporary generative works. While many multi-agent systems are ontologically awkward, the genre can tell more interesting stories. Casey Reas' works *Tissue* and *Microimage* begin to develop the homogeneous swarm, creating distinct «species» of agent with distinctive (but again fixed) rela-

tionships. The added complexity of the interaction within the system is revealed in the images, as tangled clouds resolve into dark loops and braids. Similarly Ichitaro Masuda's recent work *Haohao*[16] has multiple species of agent, differentiated in size and colour, and attracted to and repelled from each other to varying (randomised) degrees. While Masuda's code reveals that the parameter for attraction is «love», this is no agent-meets-agent story. Individuals form pseudo-stable clusters of five or more where forces of attraction and repulsion are in equilibrium; these clusters might in turn orbit other groups, and are readily disrupted if another agent approaches. If there is a social story here, it is one of pursuit, desire and loss, but above all the delicate negotiation of local collectives or cliques. Once more this dynamic informs the aesthetic of the trail-paintings which the system produces, with tight gnarls and knots, as well as dense circular orbits and linear vectors.

These examples retain the usual disconnection between agent and environment—agents interact with each other, but have no functional impact on their world. However this feature is not computationally or formally necessary, and in fact there seems to be a generative and aesthetic payoff for linking agent and environment more tightly. Mauro Annunziato's *Artificial Societies* drawings are an excellent example of this.[17] Their character arises from a simple feature of his system in which agents' paths are drawn in to the environment; agents «die» when they intersect another's path. Equipped with a simple genetic / evolutionary mechanism, the agents progressively divide their environment into isolated «habitats», each applying a particular selection pressure to the agents within it. Annunziato shows that the environment need not be a blank space, but can be a powerful generative constraint that also brings a system's history to bear on its present and future (for a further discussion see[18]). Another beautiful example comes
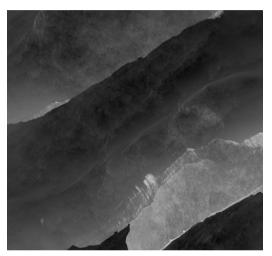
Mauro Annunziato, Contaminazione (detail)

from Dutch artists Driessens and Verstappen, whose *E-volver* software generates images using a diverse «ecosystem» of pixel-manipulating agents. Each individual agent has a (deterministic) rule-set for moving around the image and altering pixel values; yet the interaction between agents, especially *through* their shared environment, gives rise to image surfaces which are strikingly unified and organic.[19] Environment here is a dynamic terrain, a developing residue which again shapes agents' behaviour in an ongoing co-formation.

## 5. Critical Generative Systems

Narrative critiques reading software and generative art have a significant limitation, or rather a kind of grain or directionality. They can decompose a system, analyse the modes of being and relation that it encodes, but they have little to say about how those encodings play out, how they operate in a generative process. The emergence of complex, dynamic forms and behaviours from these local encodings is central to artists' interests in complex systems[20]; this is the moment of emergent generativity or the «computational sublime.»[21] Once again this is where generative art is in a unique and powerful position, in that unlike other forms of discourse, it can actually experiment with the emergent outcomes of particular ontologies, modes of being and relation. Christopher Langton inaugurated artificial life under the banner of «life as it could be»; Stefan Helmreich has argued instead that a-life systems reinscribe social conventions of «life as we know it.» However Helmreich ultimately recognises the potential of a-life in undertaking not increasingly-accurate simulations of an authorised «life», but experimental, reflexive performances of possible lives.[22]

So too for generative art, though its scope should be wider. In the critiques above I have focused on social narratives and ontologies,

Erwin Driessens and Maria Verstappen,
image from E-volver / E-volved cultures

but generative art's models might move across (and especially between) domains—physical, chemical, personal, social, cultural, technological, economic. So far I have also emphasised the prospective or utopian potential of generative ontologies, but this is only one of several possible modes or registers for these narratives; they might equally be ironic, critical, deconstructive or fantastic. Golan Levin's *Axis* applet abstracts political rhetoric into a database-driven combinatoric.[23] It's not difficult to imagine a generative process that draws its algorithms from the same source, extrapolating, diverting or visualising rhetorical entity/relation structures. Once again we should reconsider the distinction between critical, reflexive, cultural software art, and utilitarian, unreflexive, result-oriented generative art.

One of the further implications here is a reconsideration of the context for generative art. If it is fundamentally concerned with creating model ontologies, then we can imagine it in relation to other practices of formal modelling and simulation. These techniques have a long history in military strategy and geopolitics, but in recent years they have become more widespread. For example, a new branch of social science has emerged which uses simulation as a basic tool for testing «explicit models of social phenomena.»[24] One recent paper from this field claims to model the «dynamics of youth subculture,» creating a multi-agent simulation and discovering that «only a few assumptions of the individual's behaviour are necessary to regenerate known features of youth culture.»[25] In other words: we are already being modeled, in artificial worlds that can fold back powerfully into the real. Like Helmreich I would be very concerned if social modeling was used only to entrench our «known features». Unknown features must be more promising, and here again generative art can step in. Borevitz writes: «If there is a chance that software will contribute significantly to a new politically relevant aesthetics, it lies in the

way software shows us a way out of order, in and through order.»[26] Yes, but what's required is attention to the specifics of that order, its structures and properties. Generative art can, and must, do more than make images of complex systems; it can tinker critically with the systems themselves, then set them running: possible worlds.

If abstract or generative software art can, and sometimes does, work this way, where does this leave the binary of formalism / culturalism, or generative / software art? Perhaps the relation could be one of complementarity. «Culturalist» software art has often focused on intervening critically, and practically, in existing software systems, reconfiguring them from the inside. In the process it shows up the latent cultural agency of software, but also its potential transformation. For Johansson however the critical specificity of this approach is also a limit to its potential; following Cramer he worries that it might become merely a «critical footnote» to mass software culture.[27] Johansson calls instead for «an alternative» to «established formats.» By «formats» I understand cultural and social, as well as technical constructs. As I have argued we can think of abstract software art, or generative art, as potentially exploring alternative modes of being and relation, telling stories but also literally toying with complex, dynamic systems, exploring them prospectively, and not (merely) as eye-candy machines, but as model worlds. To re-state the binary: perhaps generative formalism can be prospective and exploratory, where culturalism is more local, situated, concrete, interventionist. The two strands might in fact be complementary, and their critical potential might be far greater if we think them together, instead of apart.

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**SUPPLEMENTS**

Amy Alexander is a software and performance artist and software-yapper (occasional speaker, writer, curator, etc.) She has worked in film, video, performance, music and UNIX systems administration as well as in digital media art and is currently Assistant Professor of Visual Arts at the University of California, San Diego. Amy started making digital media art in 1995 and net art in 1996. Much of her recent work has been in live VJ and musical performance and software art (often at the same time), playing with the overflow between work and leisure life. Amy is one of the founder/developer/moderators of the Runme.org software art repository (2003–present). She's also a member of the TOPLAP livecoding audio-visual performance group (2004-present). Among other things, she is currently developing a public space project codenamed «AI to the People,» which uses surveillance and computer vision technology to detect potential rock stars on the street and generate appropriate music videos for them. Most of Amy's projects can be found at http://plagiarist.org.

Inke Arns, *1968 in Duisdorf, Germany, lives and works in Berlin and Dortmund; curator and author focussing on media art, net cultures and Eastern Europe; since 2005 artistic director of Hartware MedienKunstVerein in Dortmund, Germany. Her dissertation, entitled «Objects in the Mirror may be Closer Than They Appear: The Avant-garde in the Rear View Mirror» (2004), researches a paradigmatic shift in the way artists reflect the historical avant-garde and the notion of utopia in visual and media art projects of the 1980s and 1990s in (ex-)Yugoslavia and

Russia (forthcoming in Slovenian by Maska, Ljubljana, in 2006). Her curatorial work includes international exhibitions, festivals and conferences, like, e.g. «Irwin: Retroprincip 1983–2003» (Berlin, Hagen, Belgrade 2003–04) and «On Disappearance. Loss of World and Escaping from the World» (Dortmund 2005). Founding member of various media cultural initiatives, e.g. the translocal Syndicate network (1996–2001, since 2001 Spectre) and mikro (Berlin 1998). Besides her publications «Netzkulturen», «Neue Slowenische Kunst» (both 2002) she has published and lectured extensively on issues of net culture and media art. www.projects.v2.nl/~arns/

CHRISTOPHE BRUNO. Net artist, lives and works in Paris. Awarded with an Honorary Mention at the Prix Ars Electronica 2003 for his piece The Google Adwords Happening, his work has been shown internationaly at many festivals and museums (ICC in Tokyo, File Festival in Sao Paulo, Modern Art Museum of the City of Paris, f.2004@shangai, Nuit Blanche de Paris, Read_Me Festival, ReJoyce Festival in Dublin, Version 04 in Chicago, Poes1s.net digitale poesis in Berlin, Tirana Biennale of Contemporary Art, Microwave International Media Art Festival in Hong-Kong, Vidarte Festival in Mexico City, FreeManifesta in Frankfurt, Rhizome Artbase for New Museum of Contemporary Art...). He divides his time between his artistic activity, teaching, lectures and publications.

JAVIER CANDEIRA (Leon, Spain, 1966) is a writer, teacher and activist working in the overlapping fields of art, culture and technology. In 1999 he co-founded barrapunto.com, a Spanish-language news and discussion website on free software and digital rights, which he currently runs and co-edits. He has collaborated in the redaction of the Spanish Creative Commons Licenses, and teaches Introduction to Free Software at Universitat Oberta de Catalunya.

Yves Degoyon, a.k.a. d.R.e.G.S., is a free software dealer interested into bringing collaborative tools to social networks and into making noise. http://ydegoyon.free.fr

elpueblodechina is working on psychogeography and social science fiction projects developping narratives related to the mapping of collective imagination. http://www.elpueblodechina.org

Olga Goriunova, born 1977, lives and works in Moscow. A co-maker of the Readme software art festival series (Moscow 2002, Helsinki 2003, Aarhus 2004, Dortmund 2005), co-organizer of Runme.org software art repository. Author of Suicide Letter Wizard for Microsoft Word (http://dxlab.org/slw). Doctorate Candidate in the Media Lab, University of Arts and Design Helsinki, conducting her research in digital cultural production. Author of numerous articles on new media art and culture. Author of lecture series on the history of media and philosophy of technology, taught at Pro Arte Institute (Saint-Petersburg, Russia), 2000–2001, Center for Contemporary Art (Almaty, Kazakhstan), 2001 and elsewhere. She studied literary criticism and linguistics and got her M.A. from the Department of Philology of Moscow State University in 1999.

Francis Hunger. Since 1999 active as visual artist, DJ, producer («Der elektronische Sonntag») and since 2003 Meisterschueler at the media arts program (Prof. Helmut Mark), Academy of visual arts Leipzig. Currently working at HMKV as Junior Curator. Recent works: «Krystalia» (2003), «Semiology of Cyberspace» (2004), «The SETUN Conspiracy» (2005). Research on «Computer as a male machine»—on the computers' development in the frame of a patriarchical society related to capitalist economy. Recent texts and lectures: «Die Unscheinbaren Okonomien von Open Source» (2003), «Wargames—Hacker spielen» (2003/1005), «Semiology of

Cyberspace—die Konstruktion des virtuellen Raums» (2004). An overview about exhibitions, participations in festivals and projects and publications is online at http://www.irmielin.org.

Sven Koenig arrived on planet earth in 1975 in some small boring village in former Eastern Germany. From 1995 to 1999 he was mainly hanging around in Dresden (DE) trying to study philosophy, sociology and political sciences and something else he doesn't even remember anymore. In 1998 he found a small company with some friends to ride the dot.com wave. After a while he became concerned that business would spoil his character and fortunately left the company to move to Zurich to study «New Media». In Zurich he had a lot of fun beeing a neo-dadaistic squatter throwing some parties. In 2004 he decided to take a break from Zurich to do some internship at the SAT Montreal where he was appointed artist in residence which is cool because it sounds good in the CV. In 2005 he received his diploma. Now he's an independent artist. His main interest is the quesion if «New Media Art» actually exists and if so, what it has to do with (his) life.

Eric Londaits lives in Argentina and was born there in 1977. He studied Computer Science and works as a «hard core» programmer developing computer telephony systems for banks, credit card companies, and other businesses both in Argentina and abroad. He also studied singing and acting, endeavours in which he is focusing most of his energies to compensate for all the work the left-side of his brain does daily. His participation in «Outsource Me!» was his first foray in the world of software art, but it certainly won't be his last.

Alessandro Ludovico is a media critic and editor in chief of Neural magazine (http://english.neural.it) from 1993 (Honorary Mention, Net.Vision, Prix Ars Electronica 2004). He has written: 'Virtual Reality Handbook' (1992), 'Internet Underground.

Guide' (1995), 'Suoni Futuri Digitali' (Future Digital Sounds, 2000). He's one of the founding contributor of the Nettime community and one of the founders of the 'Mag.Net (Electronic Cultural Publishers)' organization. He writes for various international magazines and he's also an expert in the Runme.org board, a collaborator of the Digitalkraft exhibitions, and has curated different new media art exhibitions. From 2005 he developed together with Ubermorgen the GWEI.org action (Honorary Mention, Net.Vision, Prix Ars Electronica 2005, Rhizome Commission 2005, nomination Prix Transmediale 2006). He's an advisor in digital culture for the Documenta 12 'Magazine Project' and he teaches 'Computer Art' in the Academy of Art of Carrara.

ILIA MALINOVSKY studied applied mathematics and information science in Moscow State University. He has worked as a researcher in scientific laboratory under the leadership of professor Kalinichenko (http://synthesis.ipi.ac.ru/synthesis) His professional interests include formal methods, ontology, description logics, linguistics, metadata modeling, heterogeneous resource integration, information collection mediation. Since recently he has also obtained an interest in digital media art.

ALEX MCLEAN is a member of livecoding gabbapop duo «slub», is reading MSc Arts Computing at Goldsmiths College, London and is a programmer for the state51 conspiracy. He co-organises the dorkbotlondon meetings of people doing strange things with electricity, helps run the runme.org software art repository, and is a founder member of TOPLAP, the Temporary Organisation for the Promotion of Live Algorithm Programming.

SERGIO MORENO, a.k.a. chaser, is a founder of several collectives working with open source tools: hackitectura.net, indymedia valencia.http://www.hackitectura.net

Jaume Nualart is a founder of several collectives in Barcelona (indymedia barcelona, riereta.net, r23.cc ) and now lives in Africa (Luanda ) where he develops free networks based on free technologies. http://ww.riereta.net

Special guest holds a BSc in Software Engineer and an MA in Digital Arts. He has been working with the Digital Arts since 1991 and has created artistic software applications, computer generated music systems, sound installations, interactive installations and synthetic characters. Exhibitions include Sonar, Zeppelin Sound Art Festival, Festival Garage and the Sonic Art Conferences.

Julian Rohrhuber, born 1973, graduated in media at the Hamburg Academy of Arts, where he studied documentary film, media theory, philosophy and programming. His works range from theoretical papers to sound installations, systems for algorithmic composition and short films. He currently works as a junior researcher in the research group «media and cultural communication» in Cologne.

Alexei Shulgin is an artist, theorist, musician, curator and photographer. Participated in hundreds of exhibitions, festivals and conferences. He is a pioneer of net.art. He invented Form Art (1997) (http://www.c3.hu/collection/form). He is a web-master at FU-FME (1999) (http://www.fu-fme.com/). He is a leader of the world's first cyberpunk rock band 386 DX (1998 – onwards) (http://www.easylife.org/386dx). In 2000–2002 he was teaching at Pro Arte Institute, St. Petersburg. Alexei is a co-organizer of Runme.org software art repository (2003) (http://runme.org) and a co-curator of the Read_Me software art festivals (Moscow 2002 -Helsinki 2003 -Aarhus 2004 -Dortmund 2005, http://readme.runme.org). His recent works include revolutionary conceptual VJ tool WIMP (http://wimp.ru), Super–I– Real Virtuality system (http://www.super-i.com/)

and Electroboutique (http://www.electroboutique.com)
http://www.easylife.org/

Leonardo Solaas lives and works in Buenos Aires, Argentina.
He studied Philosophy, and is self-taught in everything related
to programming, new media art and technology. He worked as
a craftsman for more than ten years, but eventually the digital age
came to his life and he migrated to web site design and develop-
ment. As a software artist, his work has been featured in many
local and international exhibitions, among them ZKM's
Internationaler Medien Kunst Preis, Stuttgarter Filmwinter
and 5th Bienal do Mercosul at Porto Alegre, Brazil.
Some of his works can be found at http://solaas.com.ar

Mitchell Whitelaw is an academic, writer and artist with inter-
ests in new media art and culture, especially complex generative
systems and digital sound and music. His work has appeared
in journals including Leonardo, Digital Creativity and
Contemporary Music Review. In 2004 his work on a-life art was
published in the book Metacreation: Art and Artificial Life (MIT
Press). His current work spans generative art and sonic and visual
data-aesthetics. He is currently a Senior Lecturer in the School
of Creative Communication at the University of Canberra.
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Renate Wieser, born 1971, graduated in sociology at Hamburg
University for Economy and Politics with a work on film theory.
Presently she is student of media at the Hamburg Academy of
Arts, where she works on programming, media theory and philos-
ophy. Her artistic works include short films, installations, algo-
rithmic film music, and computer models.

## Hartware MedienKunstVerein (HMKV)

The Hartware MedienKunstVerein (HMKV) was founded in Dortmund in 1996 by Iris Dressler and Hans D. Christ. Since 2005 it is run by Dr. Inke Arns as artistic director and Susanne Ackers as managing director. Uwe Gorski is its technical director and Francis Hunger is junior curator of HMKV. HMKV serves as a platform for the production, presentation and contextualisation of contemporary and experimental media art. Through its strong commitment to the field of media art HMKV has developed into a unique institution in Germany.

HMKV's work is embedded in regional and international networks. The association organizes exhibitions, film and video programs and lecture series accompanied by conferences and workshops. Furthermore, since 2000 HMKV is in charge of the six-month stipend of the federal German state of Nordrhein-Westfalen (NRW), eligible for women media artists residing in NRW.

Since the founding of HMKV several large-scale international media art exhibitions have been organised by the association, amongst others the much acclaimed exhibition «Reservate der Sehnsucht» (Reservations of Desire, 1998) in the so-called «U», a derelict brewery in the city center of Dortmund. Since 2003 HMKV uses the 2.200 square meter large PHOENIX Halle (formerly—until 1998—the site of the steel production plant Phoenix-West). Here, the exhibition «Games—Computer Games by Artists» (2003) took place—which received the «Innovationspreis» by Fonds Soziokultur as well as an award

of distinction of the German section of AICA—as well as the exhibitions «so wie die dinge liegen», «Nam June Paik Award» (both 2004), «Dispersed Moments of Concentration. Urban and Digital Spaces» and «On Disappearance. Loss of World and Escaping from the World» (both 2005).

Besides this, HMKV organises conferences on media art and net culture, as for example «404 Object not found— What remains of media art?» (2003), «Perspectives of Net Art» and «Readme100—Temporary Software Art Factory»— the 4th international Readme festival on software art and culture (both 2005).

The activities of HMKV until 2007 will be dealing, in different formats, with the theme of «Augmented Space»: in exhibitions, workshops, performances, symposia, publications, Internet applications and in European rsearch projects. «Augmented Space» is a term developed by the Russian media theoretician Lev Manovich. It designates the real-space which is permeated increasingly with digital information accessible via mobile communication devices. These elements which constitute the digital public space will be investigated in artistic-experimental projects and will be made accessible for an interested public in the context of media art.