
x.med.c
experimental media arts

editorial

The motivation behind this review originated from a series of technically, artistically and poetically juicy workshops, organized by four independent technological arts initiatives in Brussels: *nadine*, **okno**, FoAM and iMAL. More than hundred professional artists and students participated in the workshops, eager to remediate a perceived lack of experimental media education in Belgium. The workshops also responded to the need for a place where continuous learning and dialogue between peers are encouraged. Through a sequence of workshops we have attempted to share our experience, skills and knowledge with a wide group of people interested in emerging thoughts, media and technologies. *nadine*, **okno** and FoAM designed a joint programme, which started out from a mixture of introductory tutorials and moved towards master-classes and informal gatherings. This programme allowed novice participants to become prolific media artists over a period of two years. Complementary in approach and content, iMAL's workshops attracted many of the same participants, further enhancing the richness of the evolving independent media education in Brussels.

We wanted to spread the understanding of the diversity and multiplicity of tools and media that can be used creatively, as well as teach the basics of 'making-your-own' techno-artistic materials and instruments. We covered collaborative issues in the production of art, specifically computer-implemented and media-related art. We discussed wider economic, environmental, social and political implications of our works. We forged new projects, performed and socialized together, gathering a critical mass of people and organizations around topics close to our hearts.

To stimulate the reader to browse through the publication itself, we won't spoil the pleasure of discovery by describing each contribution here. We intended to bring forth a collection of interesting materials, either descriptive or synthetic, narrative or poetic in their nature, mostly reflecting the thoughts and techniques that were at the basis of our fertile collaboration. This review tends to present itself like a remnant (and annotated) degustation menu, carrying memories of the many flavours consumed on our digital tables, staining the responsive tablecloths. The dishes range from never-ending, wholesome banquets, to light and frivolous snacks, frozen bites to cleanse the palate, and refreshing flows of imagery to improve digestion.

Our ongoing gratitude goes to everyone who participated in our workshops and has worked with us to compile this publication. Their ideas, concepts, tools and examples, represent a particularly tasty cross-section of media art, which we find points to interesting possible futures.

As all the texts, images and designs smell fresh and delicious, we wouldn't want to hold you up any longer... Bon-ap!

For more of the same and radically different .x-med-a.s,
The Editors

- http://x-med-a.be
- http://x-med-k.be

The publication you are holding in your hands has a peculiar name .X-MED-A. At a first glance, the '-MED-' in the name might smell of antiseptics and invoke feelings of aichmophobia. However, -MED- in the context of this publication condenses 'media', most often digital, sometimes analogue, fibrous or even biological. Similarly, X does not imply X-rays or adult themes, but can be expanded as 'experimental' and finally, the A abbreviates art. Hence: eXperimental-MEDia-Art - the stuff that keeps us busy during much of our waking hours.

Contents

Towards an ecology of media ecology

Matthew Fuller

Should any society that can't deal with the waste it produces be allowed, allow itself, to produce anything new? Why should we be celebrating the creative use of computers, electronics, media systems, when they are simply plastic wrapped condensations of heavy metals and other poisons? Can we imagine a technology that is able to disentangle itself from technocracy, the idea that all the world's problems can be solved by the application of a narrow band of productised science?

These are not questions that this review is set up to answer, but I daresay that they lie in the backs of the minds of many of its contributors. If we work with media and technology in the present day, how can we understand and reformulate what we do in terms of the crucial realisation that the planet we inhabit is undergoing a catastrophe in which technology is both deeply implicated (the internal combustion engine, powered flight) and never more required (atmospheric monitoring and computer simulation of climate and ecologies).[1] In this introduction, what I propose to do is to firstly take some of the contents of this book as a way of pointing towards ways of differentiating technology and allowing its capacities and tendencies to become more fully palpable in specific instances. Secondly - taking off from this amazing collection of accounts, think about the politics and aesthetics of the kinds of practices (workshops, interventions, movement, programming) included in the book - this article aims to trace some ways of working that might be useful.

From accounts such as those of James Lovelock,[2] Lester Brown[3] and Jared Diamond,[4] however circumspect one has to be about their partiality, it seems odds on that within the timeframe of a few life-spans, enlightened, technological, market-happy human society is plunging itself towards a massive planetary trauma. In its pathological stupidity it seems it has no intention of at least making some partial attempt at avoiding taking more worthy specimens of life with it. Nematode worms and dust mites will go along with Las Vegas and the Vatican. Capitalism is a suicide pact we never asked to join, one which must be reneged from.

Even if such a planetary mortification, the extreme future of Earth as a burning Martian desert, used as a figure by James Lovelock, does not occur, it is there as an attractor, a virtuality embedded in a potential future which we draw now nearer, now further away from. Under the force of this attractor, capitalism is cannibalism feeding back

from such a future. Organised scarcity is organised as an anticipation of the time when, tasting passably better than the tyres from rotten cars, all that will be available to eat is the meat from each others' bones. Against the ecological collapse being brought about by an economic system that will itself collapse if it cannot stop expanding, there are a myriad attempts at change.

Amongst these is the question of technology. Technology is the absolute narcissism of the image of control and it is the shrapnel launched by the explosion of a social and ecological reality that is out of control. Equally, technology is anything produced by humans and other primates, several birds, termites, spiders and other organisms that allows them to trick themselves into associations with other entities, associations that make them more than just wildly spinning atoms: a held leaf that catches rain, an ear trumpet, a dog lead[5], nerve gas and medicine. Technology and capitalism are not mutually symmetric. Whilst they may have co-evolved, the one does not necessarily imply the other. One may have grown so much inside the other that it cannot continue to exist without a vampiric life support system. In such cases it should be ditched, dismantled.

A sage involvement with technology would aim at moving in two directions. The first would be to disentangle skills, materials, devices, ways of knowing and making from the ways they might imply a reliance upon and an inevitability of the planetary suicide pact. The parallel approach would be to work out the means by which, firstly, technologies, and by this I also inherently mean those of media, can be developed in tandem with forms of life which supplement and enhance the earth's ability to self-organise in ways that allow continued and delightful human existence as part of this planet; and which secondly, allows us to find ways of testing existing technologies against such a criteria, finding ways of conjoining and working them against such a requirement.

there are other things that need doing, and one of these is the development of an imaginary of technology, an understanding of its poetics

Here, the utilitarian answer is a modest baseline: desist from the use of fossil fuels; take part in a vegan dietary cycle[6]; make full participation in society not dependent upon either the self or the society being captured by concentrations of capital or burned energy; and so on. But there are other things that need doing, and one of these is the development of an imaginary of technology, an understanding of its poetics and a testing manifestation of those poetics in ways that allow us to think and sense through what that technology is, and what it is in composition with those elements with which it is conjoined. What is 'the internet', that subtle and amazing meshwork of millions of parts, when conjoined with a supermarket? What is it when it is coupled with sensors tracing muscle movements through and across a dancing body? What are the basic meaningful components of all this electronic and computational stuff? What are these amazingly powerful little things called algorithms?

At the beginning of one of the classic textbooks of computer science, 'Structure and Interpretation of Computer Programs' by Abelson, Sussman and Sussman, a book that is core to the culture of the Scheme language as used in Fluxus software, there is a brilliant description of the power and pleasure of computing, "The source of the exhilaration associated with computer programming is the continual unfolding within the mind and on the computer of mechanisms expressed as programs and the explosion of perception they generate."[7]

There is much of an echo of this sensibility in this vivid collection of materials. Textiles are understood to have social, political and aesthetic dimensions and a dress is described as constituting the space between the self and the non-self. Fabrics begin to perform in ways which are associated only with electronic media systems, or even weather monitoring devices. Coding, a practice normally done alone, separate from the moment of execution, is done live, at run-time. Rather than being discrete layers in a process, programming and synthetic audio visual materials fold into each other, each rearticulating the capacities, norms and sensual/intellectual understanding of the other. There is a constant switch backwards and forwards between software and subjectivation, between matter and its context, between the moments of work and the societies they are embedded in and which they make. Almost everything in the book jumps its 'proper' category. The continual unfolding of thought and technology also flows out into the world. The explosions of perception they

Illustrations by FoAM. Incorporating images of e-waste
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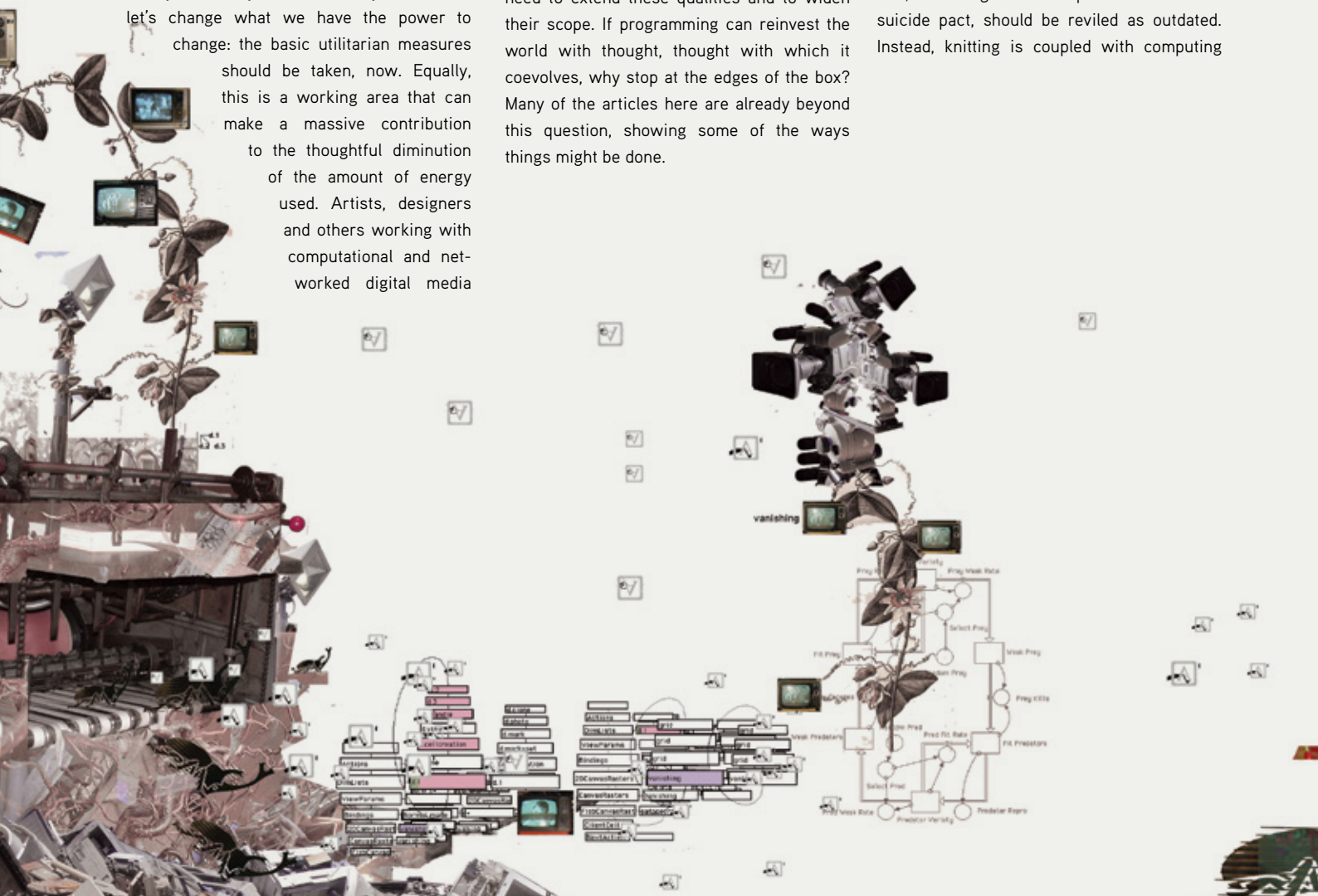
If we allow ourselves to make something new, it had better be different.

generate are always also tied up with forms of thought such as logic or other material formalisations such as clothing patterns, interfaces and choreographic diagrams. On the one hand, this means we run the risk of riddling the world with yet more figures and devices of technocratic hubris. On the other, it means we have a chance to rethink technology, computation and the qualities of our materials.

So, given that this introduction began by a discussion of the immediate crisis in the chemical and thermodynamic circulation systems of the earth and called for a careful disentanglement of technology and capitalism, what should be done, and what clues are offered in this book? Firstly, sort out your own shit. By this I mean, let's change what we have the power to change: the basic utilitarian measures should be taken, now. Equally, this is a working area that can make a massive contribution to the thoughtful diminution of the amount of energy used. Artists, designers and others working with computational and networked digital media are well placed to imagine and kick-start globalised communication cultures, devices, and technologies that supercede our reliance on carbon-releasing burned fuels. For a start, the area known as media art should wean itself fast from dependence on air travel. Whilst one of its core cultural forms is the demo, the need to show stuff working with a live human 'animateur' working the knobs, it is also an area that has an immense capacity to work on and improve technologies such as telepresence,[8] streaming and networked working platforms.

Many of the articles in this book develop an attitude to technology that is smart enough to be at once suspicious and clever enough to get under the lid and get to work at deeper levels than users are scripted for. All of the work here goes beyond the surface excitement of computing as a cultural material. We need to extend these qualities and to widen their scope. If programming can reinvest the world with thought, thought with which it coevolves, why stop at the edges of the box? Many of the articles here are already beyond this question, showing some of the ways things might be done.

Four broad currents can be identified. Firstly, tinkering: knowledge acquisition as a form of direct action; the joyful, dogged, and 'intellectual property' defying, testing and conjoining of things to find out what they can do. Secondly, this book is rich with examples of people using technologies for purposes beyond their original intentions or understood conventions – such as developing computational clothing that interacts as a mischevious, doggedly, annoyingly, recursively horny partner-in-play; or in learning by reverse engineering – and taking that principle onwards to the reverse engineering of learning. Thirdly, recognising the synthetic novelty and power of mathematico-material drives, conjugations of abstraction, calculation power and the capacities of different kinds of matter. Fourthly, a revalorisation of materials, techniques and skills that, according to the script of the economic suicide pact, should be reviled as outdated. Instead, knitting is coupled with computing



and media campaigns against slavery and corporate domination of the imagination. Here we can see handcrafts and supposedly 'obsolete' knowledge, technologies that are out of date but that crunch numbers, make words appear, make patterns fly between fingers and flow structure-forming, entropy-defying information through networks and between people and things.

Alongside these elements of work, one can see that the organisation and knowledge practices that accompany them and make them live: the interplay of workshops; collaborative groups; skill-sharing; free software, open repositories of programs and information; and a principled curiosity that operates as much through sensuality as by logic and the possession of technique... These are all ways of working that need to be developed, and which in turn can broaden their scope. If we allow ourselves to make something new, it had better be different. Read on, carefully, disentangling what is useful from what there is here and there as a residue of the culture of the planetary suicide pact. Look for some clues in these pages: they're there. ¶

Endnotes

1 See: Intergovernmental Panel on Climate Change, 'Third Assessment Report, 2001' available at http://www.grida.no/climate/ipcc_tar/vol4/english/index.htm

2 James Lovelock, 'The Revenge of Gaia, why the earth is fighting back and how we can still save humanity', Penguin / Allen Lane, London, 2006

3 Lester R. Brown, 'Plan B 2.0, rescuing a planet under stress and a civilization in trouble', W.W. Norton & Co. London, 2006

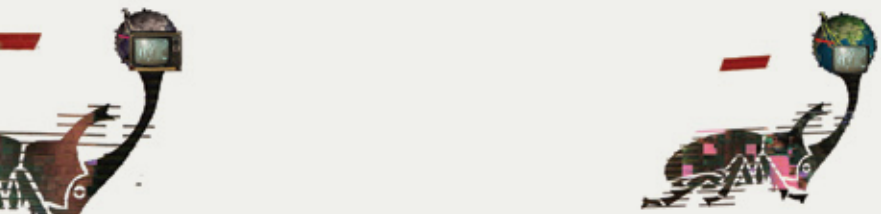
4 Jared Diamond, 'Collapse, how societies choose to fail or survive', Viking, New York, 2005

5 Mike Michael, 'Reconnecting Culture, Technology and Nature, from society to heterogeneity', Routledge, London, 2000

6 See: Gidon Eshel and Pamela Martin, 'Diet, Energy and Global Warming', Dept. of Geophysical Sciences, University of Chicago, http://geosci.uchicago.edu/~gidon/papers/nutri/El167text.pdf When Black Star (Mos Def and Talib Kweli) say 'Beef is oil prices and geopolitics', they're right, twice over.

7 Alan J. Perlis, Foreword to Harold Abelson and Gerald Jay Sussman, with Julie Sussman, 'Structure and Interpretation of Computer Programs', 2nd ed., MIT Press, Cambridge, 1996, p.xi. The thinking in SICP also underlies some of the other projects here: in fact, the book was recommended to me by Casey Reas.

8 See: for instance devices such as the Presence Chair' http://www.pre-sence.com/



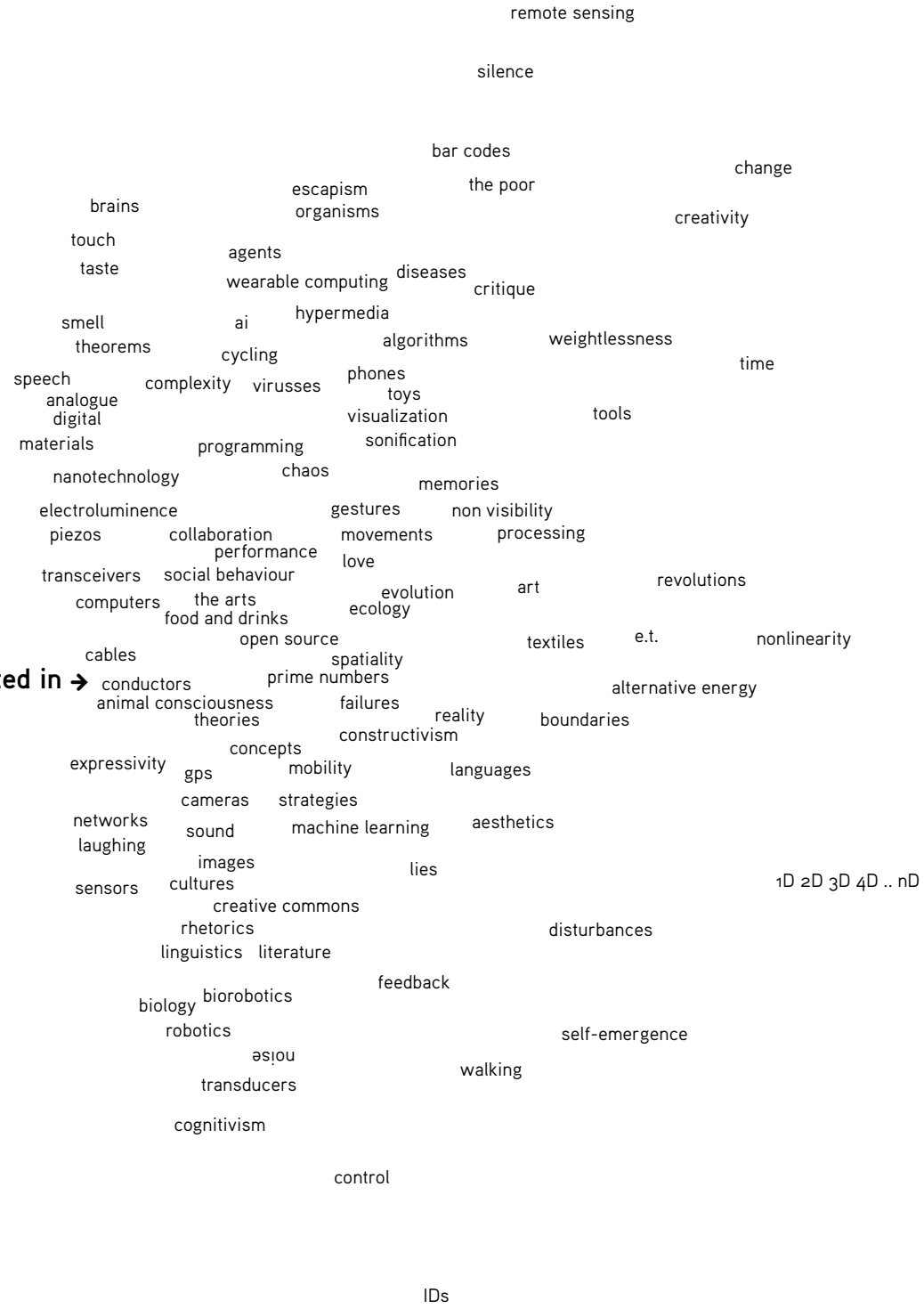
a polemic concerning the technological artist

mxhz.org

a technological artist must not be →

a sculptor
a philosopher
a video maker
a musician
a painter
a writer
a director
a theatre maker
a film maker
a curator
a scientist
a student
a politician
a doctor
a policeman
an engineer or an architect
a dancer
a teacher

a technological artist is interested in →



(edit ... to be continued)

Before|After|Poetika *[An Introduction Only]*

Guy Van Belle / mxhz.org

realizing the other day that sitting here and talking to someone about a subject, and also thinking about sound and patching it up in a little sound machine (most of the time ending up with something different from the initial idea) is far easier than switching this computer on and tapping in a consistent and understandable text. in a way we are used to reading the long strips of letters in newspapers, or the one to two lines of moving text on the television screen, or the pockets with uniform chunks rolling on and on till the story is read. in a way we don't want to end up with that at all.

throughout the years, mxHz have been trying to reflect on the changes which happened due to our own involvement in what could be called 'computer implemented art', or 'technological art'. we are a collective that reflects on what we are doing and are willing to change radically if needed (either by internal or external pressure). one remark: we call ourselves a collective since our primordial endeavour is to create collaborative works. and even if we have sometimes made solo works, we are aware that they are always based on shared content, shared skills, a strong will to communicate them, and finally related to the small social group's focus and development.

earlier on we were thinking a lot about defining a sort of aesthetics that could not only explain our way of working and performing, but could also drive a programme for an experimental set of actions within the arts. we have gradually become aware of the discrepancy between on the one hand the theoretical discussions concerning media works and on the other the organizational problems, such as the development of technological skills related to the aesthetic activities we are all involved in. maybe we need to create an in-between explanation that can be labelled as 'poetics' rather than 'aesthetics'. what follows is composed of random thoughts in the direction of creating a possible poetics for the early 21st century.

these discussions will be further developed within the framework of **okno**.be, which includes the sub-organizations mxhz.org, code31 and so-on, which is why we consider this text preliminary. in pointing out the different directions we hope not to limit ourselves to the artistic context only. we tend to see our work within a wider socio-cultural and political environment, relevant for many different forms of collectives. our networked and mobile settings are a deliberate and substantial choice, and so is our localization in whatever we bring into the public arena. in an earlier version of this text we started with comparing complex political and social situations to our lack of insight at the moment itself. by now all of us are convinced we have a broad overview of what happened historically in the 20th century. but many questions remain. to give an example: though we were living during the 1990s and were actively interested in the background of the breaking up of yugoslavia, in a sense we did not see what was really happening there or could not perceive what this background was. it is like being too close to the mirror to see the reflection properly. similarly, our personal activities and how we reflect on them and take explanations for granted, repeating and slightly modifying them when necessary, blind as we are and will always be for immediate processes.

several strategies to gain enough distance - apart from this writing - can be applied: [1] shock, the induction of a fracture that stops the continuity as things develop over time, changing its course, halting or stopping it; [2] geographical retreat into unknown territory, abandoning familiar objects, friends and relatives, known procedures for organizing daily existence; [3] the setup of a system to be described maybe by mid-2006 as 'contra-performance inexpliquée' or: from the deconstructive attitude into a rebuilding upside down of a new temporarily present artefact, that self-destructs when the medium it is communicated in becomes illegible; [4] application of explicit intolerance of the normal, the predictable and the obvious in aesthetics, things with a purpose and a safe existence in a defined locus.

we were sitting facing one another while eating, drinking and writing notes - outside it was raining - talking, thinking aloud and using the food as an excuse for making enough silence for reflection to happen. [mentioning the weather here is not important]. but until today, first of all, why does it puzzle us and why do we really want to explore possible issues like: to start with, whether cultural and socio-political critique is still possible today,

which leads to the secondary question of finding out what the new formats (that this rhetoric should take on) are today, ending with the possible description of what poetics could hypothetically be these days at all. we might as well just have a song or a dance and laugh, which we indeed do once in a while. now let us turn to describe what we normally do not explain at all but just do: a song, a dance, a laugh. [later we'll do the opposite and reflect on how to sing and dance or laugh through the description of the process inside the structure and content handling of the creative piece we have in mind].

in the context of literature studies, we know of 'poetics' as an old form of critical text writing, though that is not a limiting explanation. in a sense we believe that the approach to understanding writing is similar to understanding any other artefact made in any medium. the many poetics we know are in fact very diverse. think of the historical sources on poetics, such as aristotle's (http://www.gutenberg.org/etext/1974) or horace's (http://www.english.emory.edu/DRAMA/ArsPoetica.html) or the more contemporary 'poétique d'oulipo' (http://www.fatrazie.com/Laprand.htm).

approaching the time of writing this, we find that different views on poetics have been formed for a variety of purposes, but in general they have a tendency to pinpoint the more technical aspect of the creative writing and relate them to the social environments in which the activity takes place. though they mostly overlap, treatises on poetics are different from those on aesthetics in that they tend to give us almost a manual for writing. of course (and related to the specific intensions of the writers on poetics) there are different flavours of poetics. for instance, they can be prescriptive (what styles can you use and how do you write within that style), descriptive (what styles are around and how did writers create that style), analytical (what techniques have been used in the history of literature and by whom), synthetic (what combinations yield what result), or intended for evaluating literature (the good, the bad and the ugly). interestingly enough, poetics has focussed on different aspects of the interpretation of literature by analysing the works according to the world they exist in (context), or basing itself on the attitude of the audience and readers of the works (reception). poetics often takes as a starting point the life of the author as a timeline for explanation. within what is called close reading the opposite approach is followed: the work itself is seen as the nucleus from which everything can be learned, mainly concentrating on the use of language. over the past few years there have been many extensions and combinations, especially with contextualization and mediatization, even though basically this was already present in the older poetics. think, for instance, of horace's famous 'ut pictura poesis'.

socio-political possible today?

now, the (probably unanswerable) question remains: what are we doing now (is the 'why' still appropriate here)? and first of all, how can we describe it properly? this begs the question as to why there are so many manuals for different software (by the way, all prescriptive!) that are used to create artefacts and none that generally describe the techniques for making technological works. Our answer is not simple and as such will have to be reconstructed by the reader from the fragments and snippets that are left here, filling in the gaps. only through doubt, with pointers into different directions, by taking multiplicity and paradoxes seriously can we create fertile ground for new techniques for synthesis to emerge from. only in this way can we avoid activities getting paralysed and losing the dynamics essential for further development. maybe this is also the reason why pierre schaeffer stopped his sound research with the remarkable work on poetics, 'traité des objets musicaux'. and we can ask ourselves: do we create better works after reading it or do we become more predictable and closed in by the overwhelming descriptions? the same would be true for perry cook's 'music, cognition and computerized sound: an introduction to psychoacoustics', and curtis roads' 'computer music tutorial'. actually we think that we become technically better but not content-wise, and certainly we become more disciplined. if we don't fight back. critically, the questions still remain: how are we going to talk and what are we going to work on?

maybe we will never really write the intended 12 chapters of our poetics:

1

the presence of a generally accepted network for electronic communication implies that new creative artefacts are mainly developed for this medium, and gradually take a bigger distance from physical or really existing works, locking these into an earlier disciplinary format. it implies also, thanks to the technical construction of the communication algorithms running on it, that - as the futurists already stated - time and space died yesterday. or the exact 'happening' situated in time and space has gradually become irrelevant when we internalize this property into the work, i.e. that maybe the development of activity through time is important, but the exact synchronization is no longer and that the new works are somehow infinite in all directions.

2

the way we describe creative activities can come very close to the earlier 'actor network theory', and boils down to the reimplementation of object-oriented and parallel distributed computing into critical thinking: take an object and describe all possible internal and external parameters, then follow the links and describe all the related objects identically. through recombining, parallelization, contradicting and extending this creates a new object. accentuating the interactions that occur between objects, we can invent non-existing objects that oppose existing ones and vice versa. reality and imagination are just essential zero or border crossings within the creative artefact.

3

what if we treat everything that exists within the network of networked and non-networked creative artefacts, physical and non-physical people, actions and activities, as the material that makes up the creative artefact?

4-6

there are many political and ideological issues at play. with political we mean two things: (1) present political themes criticizing society and culture in an explicit way and (2) the hidden layers of experimental changes to existing artefacts, from sound over visual elements to a different and new structure or composition, but essentially undermining the continuity of style. one breaking point, and therefore very political in culture, is the recent proliferation of open-source issues that have spread from pure software development to creative content development. this leads to different topologies in the distribution of works and undermines the traditional financial infrastructure that disciplinary art forms still largely rely on. this has also led other things to change. when a collaborative open publication exists, it has to be read and evaluated differently from an editor-dominated, hierarchically created book, since its creation and development are based on other parameters. this fits in with the current disdain our society, its economists and politicians have for the organization of learning and of innovation in learning. this is currently a weak point in open-source development but, once overcome, it can revolutionize and reinstall the democratic emancipation of general free education as an alternative track to state and company installed ersatz learning.

...by taking paradoxes seriously fertile ground for synthesis

multiplicity and
ustly can we create
or new techniques
to emerge...

7-8

as described above, creative content development today has to deal with the repositioning of the different levels of involvement of both composer and engineer into a new shared status. we urgently have to abandon copyright as it is today. creative commons is the least of all evils but will not hold when the complexity of the creative content development rises with an increase of collaborative and both non-physical and non-human works. there are many paths that will lead to this, which are already in existence.

9-10

parallel to the development of shared creative content, we have to develop organizational experiments with virtual cultural communities as well. just as the educational and knowledge implementations are essential parts of open source development, a crucial point in the creation of common artefacts is the organization of the development in a way different from the one we know. what are the new formats collectives (can) use to establish distributed collaborations, which finally lead to the formation of new sustainable groups with specific (temporal and non-locative) activities? in this the parameters are formed by what is essential to make distributed actions successful, while parallel developments are not seen as competitive but enriching.

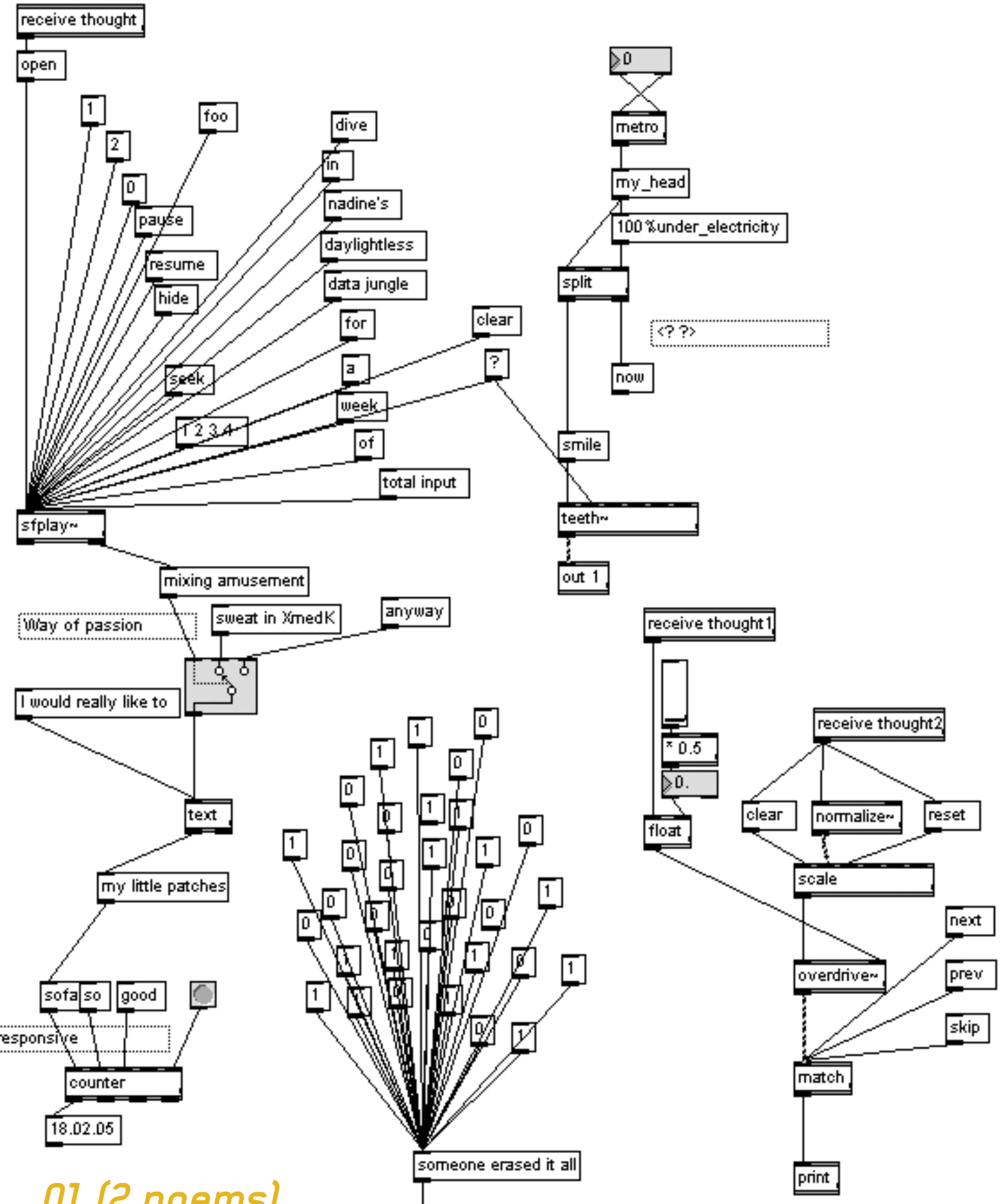
11

the many cross-disciplinary actions that are now positioned at the fringe of cultural activity have become central to new developments, whereas the former disciplinary artefacts in reality remain on the surface, with minor impact on their audience. it is not the counting of visitors that enter a door that determines the presence of a work within a cultural environment, but rather its positioning in the virtual network. increasingly cross-disciplinary works that transgress the real and imaginary, from documentaries to abstract movies, together with real-time interactions that change the creative objects to an unrecognizable (from the original since it is only an instance) level require a new theory of semiotics: representations can create new interfaces that create new cross-synthesis artefacts in a myriad of unpredictable ways. the reinvention of semiotics within this context can lead to a new impulse radically to abandon the current kitsch in pop, music and theatre, dance and painting, writing and performing literature, etc... since new syntheses will always be more exciting than copying and mixing the existing forms.

12

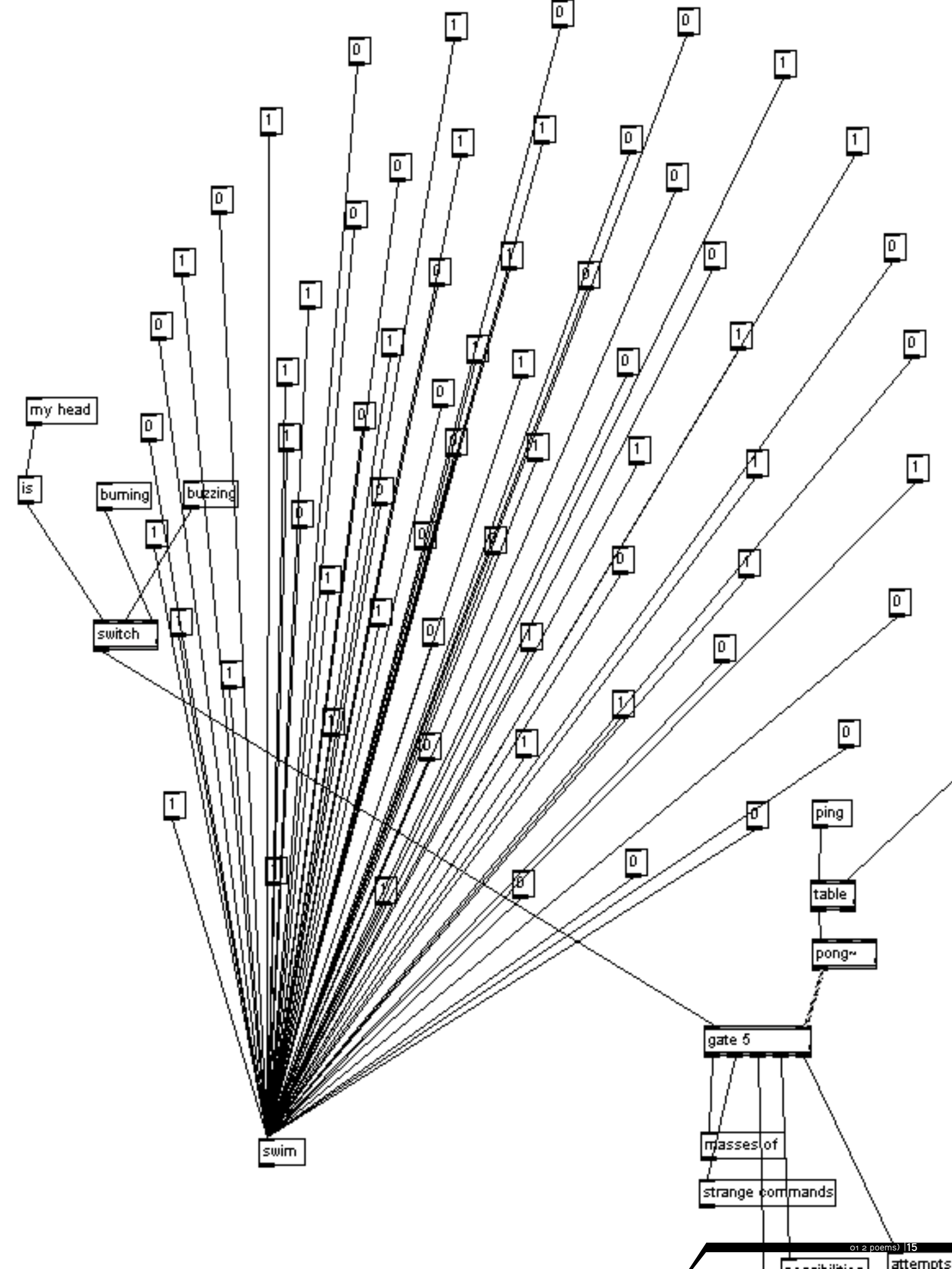
the final chapter could bring the previous technical descriptions of innovating activities together in the context of internationalization, mobility and new views on non-included, developing areas. in this light the making of an ecological alternative to our technological culture and arts could be included: the use of alternative energy for artbot development, the cultivation of non-polluting materials, and the construction of ecological environments for display and performance could be an essential part of this.

(to be changed) ←



01 (2 poems)

agnez brewer


my head
is
burning
buzzing
switch
swim
ping
table
pong~
gate 5
masses of
strange commands
attempts

as→

Bartaku

array; bit; black; blue; border; byte; carrier; chaos; complex; cold; conductive; connection; contrast; count; dark; decode; elastic; encode; entry; fast; feel; fluid; frame; free; heat; here; horizontal; image; intimate; information; isolation; knot; light; left; links; loosened; man; me; memory; modification; motion; narrator; natural; no-sense; now; on; off; one; order; pendant; public; pull; push; qualitative; quantifying; reason; record; recovered; recto; recycled; red; registering; resonance; rhythm; right; root; ruptured; sense; she; sign; significance; signifier; slow; smell; soft; software; sound; still; stitched; stop; start; strands; stretch; string; structure; subsidiary; tangible; text; thread; tone; torsionned; transformer; transition; trigger; unit; unwinded; unwire; vast; verso; verso; vertical; wandering; wearable; white; winded; wire; woman; wool; working; yellow; zero,

→*Then stop and sing.*

active Materials: [a glossary]

Joanna Berzowska, XS Labs

Textiles are among the first composite materials engineered by humans. They have mechanical, aesthetic, and material advantages that make them ubiquitous in both society and industry. The woven structure of textiles and spun fibers makes them durable, washable and comfortable, while their composite nature affords tremendous variety in their texture for both visual and tactile senses.

Smart materials (such as "smart fabrics") can be defined as materials that replace machines and have the potential to simplify engineering considerably. They integrate the functionality of various separate parts into a single material. This is mechanically efficient because it eliminates the need for parts to be physically interconnected.

Electronic textile (sometimes called "smart fabrics" or "wearables") refers to a textile substrate that integrates capabilities for sensing (biometric or environmental), wireless communication, power transmission and interconnection technology to allow sensors or things such as information processing devices to be networked together within a fabric. The substrate for an electronic textile (the textile "circuit board") is often constructed from various conductive yarns instead of wires.

Conductive yarns are either spun or twisted and incorporate some amount of conductive material (such as strands of silver or stainless steel) to enable electrical conductivity. These yarns can have various electrical properties. They can be woven, knit or felted together with non-conductive yarns to create the substrate for an electronic textile. Recently, the heating of fabric using conductive yarns and threads woven into the textile has been demonstrated for the purpose of keeping people warm.

Thermochromic materials have different color states at different temperatures. They literally change color with temperature. They are an example of an "active material", together with materials such as photochromics, electrochromics, and shape memory alloys (Nitinol). Color change fabrics in the form of printed textiles are known. Most of these applications rely on body heat to induce a change in color. Some systems involve a layering of screen-printed resistive inks and thermochromic inks, in which case the conductive/resistive ink heats up and changes the color of the thermochromic ink.

Non-emissive materials are materials that do not emit light. In contrast to emissive technologies such as light emitting diodes (LEDs), thermochromic inks simply change color and do not light up. This distinction is significant because it differentiates my work from the "rave-wear" associations of most visually animated textiles and remains closer to the tradition of weaving and textile printing.

Soft electronics is a term that we use to describe the use of conductive yarns and fabrics, active materials and flexible sensors to allow the construction of electronic circuits on soft substrates. It implies a move away from traditional electronics and an exploration of emergent materials that can enable physical computation for the body and personal spaces.

Active Materials:
[POWER . CONTROL . ACCESS . MEMORY]

Joanna Berzowska, XS Labs

Active materials – physical materials that have the ability to change over time – introduce many exciting opportunities for art and design, but also present many new challenges. These challenges are not only conceptual (how to imagine animated, interactive artifacts that have unexpected reactions or behaviors), but also political, environmental, ethical, social, and cultural.

Most physical materials change over time: they melt, decompose, fray, break, or stain. Active materials, however, are predicated on new and emerging technologies insofar as they change in more pronounced and less destructive, as well as reversible and repetitive ways. We now have access to materials that change their visual and electro-mechanical properties: they can alter their color (thermochromic, electrochromic, or photochromic pigments), shape (various shape memory alloys and polymers), texture (nanomaterials that are capable of mechanical actuation and dynamic stiffness), or level of illumination (electroluminescent materials or organic light emitting diodes).

In order to work intelligently with such materials and design interesting and sophisticated artifacts, we need to think deeply about our motivations and vision, instead of being seduced by animated matter (much like we are seduced by the flicker of a cathode ray tube). We need to think deeply about why we want the materials to change and who initiates this change. Who are the actors, what is the stage, and where does the activity happen? What does it mean? Is it a private or public performance? We also need to think about political, social, and legal issues such as surveillance and privacy, the shifting definitions of private and public, and the constantly evolving technological infrastructures that modulate our social relationships. Finally, we need to urgently start looking at environmental issues, as these materials are often composites that require portable sources of power and present challenges for recycling and reuse.

Extra Soft Labs

XS (Extra Soft Labs) is a design research studio based in Montreal, where we develop artifacts that are extra soft and react in unexpected ways to our bodies and our environments. We develop and implement new methods and technologies for electronic textiles, wearable computing, and reactive garments. Materials such as thermochromic pigments, light emitting components, miniature speakers and conductive yarns are used together with input devices such as soft fabric switches, variable resistors and capacitive sensors to construct reactive garments. We are particularly concerned with the exploration of simple interactions that emphasize natural expressive qualities of electronic circuits and of the body.

Of particular interest to XS Labs are the many relationships between our bodies and the architectural spaces they inhabit. Our clothing is one of the first such structures, often talked about as a "second skin", which enables an important level of interface between the human flesh and the outside world, physically and metaphorically. This is why we are concerned with active materials that can be easily integrated into textile substrates and that can be controlled through soft electronics.

We pursue four main research directions: soft electronics, textile-based non-emissive displays, intimate technologies, and memory-rich garments.

Soft Electronics

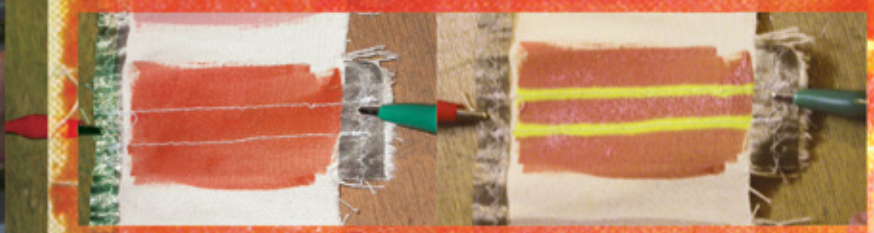
The first research direction attempts to solve technical problems and look at new construction methods for the development of textile substrates that function as soft electronic circuit boards. We construct simple electronic components with techniques such as weaving, sewing, embroidering and tying knots (can be manufactured in similar ways to non-electronic garments). Soft electronics are important, since wearable technologies are intrinsically close to the body and need to be comfortable and even pleasurable to wear; however, the softness presents both problems and opportunities. Textiles are traditionally strong, flexible, and resilient, so they can withstand much more abuse than a hard circuit board. The main problems deal with finding solutions to insulate electronic fibers from one another, while addressing the need to reliably connect other components to those same fibers. The opportunities include the ability to exploit the rich traditional skill sets and expertise inherent in textile and garment making, as well as the ability to use the circuit as an aesthetic element of the garment design.

We now have access to materials that change their visual and electro-mechanical properties

Non-emissive displays

The second research direction is similarly a technical exploration and development of various composite materials that can change shape or color, while still retaining a flexible, textile-based structure. We develop textile substrates that integrate conductive yarns, control electronics and various active materials, such as thermochromic inks or shape memory alloys in order to build non-emissive, multi-pixel, fully addressable textile displays. These displays are created using traditional textile manufacturing techniques: spinning conductive yarns, weaving, embroidering, sewing and printing with inks. The conductive yarns that address the display can be untied from the control electronics and the whole display can go through a wash and dry cycle without damage.

Soft electronics. Photo by Mette Ramsgard Thomsen



Working with resistive heating and thermochromic inks. Photo by Cocky Eek

Textiles are traditionally strong, flexible, and resilient, so they can withstand much more abuse than a hard circuit board.

Intimate technologies

Our interest in intimate technologies stems from the physical proximity of these technologies to our bodies. As designers of wearable technologies, we need to ask why we want our fabrics to be electronic. What kind of information processing do we want to carry out on our bodies? What kind of functionality do we want to enable inside our clothes? The clothing and electronics industries are looking for the killer application, the next big thing that will introduce wearable computing to a mass market. However, we feel that many of these research directions are misguided. The focus on health monitoring and surveillance technologies clearly reflects the military funding structures and fails to deliver appealing product ideas that respond to personal, social and cultural needs.

We live in a complex world composed of bits and atoms. We regularly interact with people, computers and other objects in the environment. The computing and communication capabilities we integrate into physical objects are rapidly increasing, but do not necessarily translate into "rich" interactions. As thinkers and designers, it is imperative to ensure that the interactions between people, computers and the physical environment are useful, enjoyable and, most importantly, meaningful.

Mihaly Csikszentmihalyi writes that physical artifacts help us objectify the self in three ways. They can be viewed as symbols of personal power, symbols of the continuity of the self through time, and symbols of the permanence of relationships that define the individual in a social framework. Similarly, the idea of costuming is effectively used to hide, reveal and distort the self that we present to the world. We use clothing to express a lot of things: social class, economic class, mood, self-esteem, sexuality, profession, religion and overt branding through labels with the associated lifestyle promised by advertising.

Wearable technology in the form of clothes is thousands of years old. Clothing is also one of our most intimate and personal technologies; it functions as protection, disguise, and interface to the world. As such, we should not forget about the intimacy of electronic textiles. Research should not be afraid of the conceptual proximity of these technologies to the body, and should explore the potential for playful disguise, personal expression and experimentation.

Memory-rich garments

Because of its extremely close relationship to our body, our (non-digital) clothing is able to witness some of our most intimate interactions; it is able to record our fear and excitement, our stress and our strain, through the collection of sweat, skin cells, stains and tears. It becomes worn over time and carries the evidence of our identity and our history.

Digital technologies allow us to shape and edit that evidence to reflect more subtle or more poetic aspects of our identity and our history. Patterns of touch, stress, and bending within garments (the subtle wrinkles of time and use) can be quantified digitally and utilized to reconfigure physical patterns and additional characteristics of those garments. Gestures and personal history can, in this way, be perceived, manipulated and represented on displays integrated into the fabric. Collectively, these digitally-augmented garments change and modulate social interactions by mediating between our personal identity and history and our social/cultural/collective milieu.

Our Memory-rich research focuses on the design and production of reactive garments that display their history of use. We have created conceptual and technical prototypes that examine how embodied memory can be communicated through clothing. A variety of input and output methodologies are explored to sense and display traces of physical memory, raising the question of what exactly do we want to remember and what do we want to forget.

Computer memory is distinctly different from human memory insofar as it acts as storage for data, as opposed to the rich, contextual space that defines human memory. Computers do not forget things in the same way that humans forget. At the same time, a computer can store images with great accuracy but cannot identify one image as being similar to another, which humans can do quite easily. Once the term "memory" became established in computer science, a computer-based definition of memory infiltrated our discussions of human memory. The "memory industry" thus defines the concept of memory in a very objective and impersonal way. Photos and video register memory as events in time instead of stored experiences. Memory-rich research, on the other hand, deals with memory as it relates to the body and the interaction between people through the use of their bodies.

Surveillance and defense

We are also concerned with the question of how concepts of memory are being shaped by the current political climate of security (and therefore surveillance), resulting in the proliferation of mobile/portable technologies that enable us to capture, store and share various aspects of our daily lives. The technologies we use are so seductive that it is easy to forget the military (mostly US Defense) funding history of many of these technologies.

The Institute for Soldier Nanotechnologies (ISN), for example, is a research center at MIT in Cambridge. Established with a $50 million contract from the U.S. Army, its research mission is to use nanotechnology to dramatically improve the survival of soldiers. The ultimate goal is to create a 21st century battle-suit that combines high-tech capabilities with light weight and comfort.

> We cannot forget that sensors are, by their very definition, technologies of surveillance.

The ISN "Mechanically Active Materials and Devices" team develops nanostructured polymer actuators, liquid crystalline thermoplastic elastomers for actuator and electromechanical applications and chemically-switchable magnetic materials for actuators. These are very exciting new materials that will doubtless have many applications in other fields such as architecture, design and art, but we cannot deny that the military funding structures have a strong impact on the research directions that are pursued and the ones that are abandoned.

Other well-funded research involves medication compliance monitoring, biometric monitoring of young children and elderly patients, as well as tracking of children or Alzheimer patients. The loss of personal privacy implicit in such monitoring and tracking is often presented as a welcome necessity in these scenarios and is indeed easier to accept when faced with the fear of losing one's children or the fear of threats to national security. The idea of intrusive domestic connectivity and ubiquitous biometric monitoring might also be appealing to people whose only other choice would be to reside in a nursing home or other assisted living situation.

Despite the promise of increased security and independence, electronic freedom activists find such a surrender of basic privacy disturbing, in particular when faced with the potential for abuse and misuse or these technologies. Privacy concerns become more urgent when considering the greater social acceptance of digital monitoring devices that can be implanted in any product, for any variety of personal identification, security, financial and potential healthcare applications. Many XS Labs projects aim to visually represent the subtle personal data recorded by electronic garments, in order to underline the potential for surveillance and monitoring, the blurring of private and public spaces, and the fact that such personal data will need to be legislated...

Access and Control

We cannot forget that sensors are, by their very definition, technologies of surveillance. Most sensing and tracking technologies were developed through defense funding and the sexiness of non-military applications needs to be questioned. Most importantly, levels of control and access to the devices and the information that lives inside them will vary greatly depending on who programs the devices, what sorts of data-points these things record and remember, who owns the memories that these devices harvest, and who is given access to our personal sensor data. We need to ask who controls that information and who is given access. How do these technologies empower but also disempower those who integrate them into their lives?

Power and ecology

In addition to the metaphoric definition of power in relation to wearable technologies, we also need to look at the literal definition of power. In the design of mobile electronic devices, power is one of the most difficult restrictions to overcome, and current trends indicate this will continue to be an issue in the future. How do we power these interactive, reactive, or active artifacts? Designers must weigh wireless connectivity, CPU speed, and other functionality versus battery life in the creation of any mobile or wearable computational device. Clever power management techniques, eco-design principles, as well as new fabrication and device technologies need to be developed to steadily decrease the energy needed for electronics to perform useful functions. In addition, we need to explore power generation by the user to alleviate design restrictions and enable new products such as batteryless on-body sensors.

Finally, we also need to be very aware of the ecological implications of integrating embedded electronics, in particular in textile-based substrates. Recycling composite materials becomes increasingly complex, as it is difficult to separate different materials. We must recognize our responsibilities as designers to create artifacts with a focus on eco-design, power conservation and sustainable energy.

The promise of the super-powered magical active material that can change shape, color, and texture at will is attractive to some eco-activists. They predict a future where we will only own a single garment (the hardware) and purchase designs (the software) to will infinitely alter its properties. But those of us who have owned more than one cell phone in the last three years will recognize that this is wishful thinking. The life cycle of consumer electronics products is getting shorter and shorter. New versions with new features flirt with us every few months. Reactive garments, filled with active materials, can thus be viewed as hard-to-recycle waste with built-in obsolescence. ¶

One of the experiments during the Soft-wear Active Materials workshop.
Photo by Johanna Berzowska

Searching for the Perfect Beep

Nicolas Collins

I built my first working circuit in 1972. I was 18 and it was an oscillator. For several months I had been messing around with a second-hand Tandberg reel-to-reel tape recorder containing a hidden, undocumented switch that, when thrown, induced delicious, semi-controllable, distinctly un-Scandinavian swoops of feedback. I was smitten by the siren call of electronic music, but unable to afford any of the instruments available at the time: synthesizers – from Moog or Arp or Buchla – were playthings of pop stars and universities.

Integrated Circuits, on the other hand - the guts of those costly machines – were getting cheaper in inverse proportion to their sophistication. New chips contained 90% of a functional circuit designed by someone who really knew what he was doing; the remaining 10% could be filled in by someone clueless – like myself. The trick was finding the right chips: in the days before the World Wide Web, information was so much more compartmentalized, with precious few leaks. When data did trickle down from the engineers to amateurs, through tech-porn magazines with titles like Popular Electronics or Wireless World, it was passed from hand to hand like samizdat literature.

My first chip was a Signetics SE/NE 566 Phase Locked Loop. Intended as the bleating soul of a Touch Tone telephone, this was an 'oscillator on a chip' – perhaps not quite so versatile as one from Robert Moog's hand, but at 5USD it was considerably cheaper. Years later I discovered that this same IC was the heart of Paul DeMarinis' first circuit, an electronic sruti box, and David Behrman's extraordinary 100-oscillator home-made synthesizer - this one chip may have been to the development of American electronic music as the Stratocaster was to the rise of rock and roll. Mine sat regally in the center of an overly large circuit board, encased in a phenomenally ugly (yet to me very professional-looking) metal box, with a crinkly matte-black finish, festooned with orange Dymo labels, officiously designating a few mismatched knobs, switches and jacks as 'pitch,' 'on,' 'output,' etc.

Ugly or not, this box not only made electronic music from the moment it was turned on, it also twisted truisms that might otherwise scare off a young experimentalist: ignorance is bliss, two wrongs can make a right, and anything worth doing is worth doing wrong – the house rules of hardware hacking, coined long before the emergence of the 'For Dummies' imprint.

The next fall I started college at Wesleyan University, where I studied composition and performance with Alvin Lucier, and picked up electronic skills any way I could: I scrutinized circuits in proper engineering journals like a first-year rabbinical student, with only a nodding acquaintance of Hebrew, gazing at the

Talmud; I stole bench space in the physics lab; I drank a lot of cheap beer with Ron Kuivila; I sat at David Behrman's feet through an invaluable guest residency; I joined David Tudor's 'Composers Inside Electronics,' the Masons of silicon; and I nagged Bob Bielecki for advice when all else failed.

My approach to design lay somewhere between the time-honored tradition of 'reverse engineering' (take something apart, copy it, make a variation, see if it still works, try another variation, etc.) and joining the simian typing pool working on Shakespeare (random component substitution.) I blew up a lot of chips, never acquired a decent grounding in general electronic theory, but became quite proficient at a few specific types of circuits that were useful to me (if no-one else) musically.

Near the end of the 1970s the first affordable microcomputers came on the market. Cajoled by the visionary Jim Horton, a handful of musicians invested in Kim-1s – a single A4-sized circuit board that resembled an autoharp with a calculator glued on top (DeMarinis intended to program his to sing 'Oh Susannah.') Programming this thing in machine language (and storing the program as fax-like tones on a finicky cassette tape recorder) was an arduous, counter intuitive, headache-inducing process, but coding offered one great advantage over building circuits: it was easier to correct a mistake by re-programming than by re-soldering. Over the next ten years Apple, Commodore, Atari and others introduced machines that whose increasing sophistication (and eventual introduction of disk drives) gradually reduced the angst-factor of programming, and home-made circuits faded into anachronism.

photo by *nadine*

Like the distinguished Dr. Jekyll, or that cousin who leased out the ancestral home as the set for a porn film, I maintained a secret life of hardware even as I programmed away. I usually found that a circuit or two hanging off the computer spiced things up a bit, but I wasn't getting any younger, and I felt there was no need to call attention to my saddle shoes in an era of Doc Martins.

Cut to 2000: the millennium flops over, the computers keep running, the only sign of impending disaster is the coronation of a pretender to the American throne. I'm teaching in a computer-centric art school (The School of the Art Institute of Chicago) and I find myself repeatedly helping students seeking non-software solutions to design problems: 'How do I get the computer to tell when someone sits on the chair?' 'How do I make noises that can hang in the branches of trees?' 'How can I make a hydrophone?' Eventually I am persuaded to offer a summer class in what has by now become a forgotten black art: Hardware Hacking. It makes me feel like a living national treasure, like the oldest kimono maker in Japan, but students love it (my wife responds, witheringly, 'what do you expect when you offer a course in "Gameboy for Credit"?')

The course begins with listening: making contact mikes and piezo drivers, experimenting with coils and tape heads, twitching speakers with batteries. We lick our fingers and lay them gently on a radio circuit board: small currents flowing through our skin create feedback paths that tip the circuit into oscillation and transform the radio into a touch-sensitive synthesizer in the style of the infamous STEIM Cracklebox. We open and re-wire toys in the tradition of Reed

Ghazala's 'circuit bending.' Digital logic chips are misused to build simple oscillators, distortion circuits, gates and panners. We listen to the video signals from cameras and video games, and hack LCD-based toys to create miniature pixel animations. We finish up, exhausted, with 'glue' circuits: simple mixers, amplifiers and power supplies that can be used to pull everything else together.

There's always this beautiful moment (usually around the time of discovering the ticklish spot that causes the radio to swoop and warble) where euphoric self-confidence sets in.

The emphasis is on instruments that are easy to build, robust, tactile, performable and permutationally rich. We make extensive use of photocells, direct contact with the circuit board, pressure pads and other intuitive, gestural interfaces. There's always this beautiful moment (usually around the time of discovering the ticklish spot that causes the radio to swoop and warble) where euphoric self-confidence sets in. Everyone leaves happy, fearless, and an obvious threat to the electronic possessions of roommates, lovers and children.

My class handouts grew into a hand-made textbook, which expanded with each offering of the course. The book escaped into the wild, and bit Phil Hallet at Sonic Arts UK, who arranged a tour of 'Hacking Workshops' in England and Northern Ireland in January, 2004. It crossed the Channel and lodged at STEIM, where I was asked – in a truly coals-to-Newcastle moment – to offer a workshop in the very birthplace of the Cracklebox. Guy van Belle showed the book to Annemie Maes, who invited me to present a workshop for x-med-k/*nadine*. The project ran October 4-9, 2004, and provided a sweaty contrast to the software workshops they had been offering previously.

I finish this essay as I sit in the legendary studios at Mills College in Oakland, CA, having just finished the most recent workshop. The subject continues to have new-found relevance to a generation of artists brought up on digital technology and software tools; here in the birthplace of microcomputer music, savvy programmers have fallen under the spell of the simplest of circuits – as they did in Brussels and Belfast, Norwich and Chicago. The handbook has evolved to the point that Routledge has asked to publish it. I hope I'm not going to wallow in nostalgia forever, but for now the beeps are sounding pretty good. ¶

photos by so-on

photos by so-on

overflow~

Alejandra Perez Nunez

Computers send one another timing signals. They display control messages which they send and receive to/from each other. The volume of the sound increases as layers are added. It is sound from the lectures and workshops of .x-med-k.

What happens when a person finds himself obsolete, 'out of sync' compared with the rest of the world? In our post-industrial late capitalist era, adaptation is related to the adoption of codes and metaphors such as speed, instantaneity, globalization and networks. What happens with learning situations when they need to face technology-related gaps? The learning experience overflows, saturated by the amount of needs, which are not only technological. Not only do skills need to be taught, one usually needs to comprehend the wider subject. Can we expect traditional learning settings to provide an environment that will be satisfactory for such a reality? Collaborative work and the development of different ways of teaching as sharing knowledge instead of only 'giving away information' to others have a place within this line of reasoning.

If you consider that all the information is inside the machines and inside the minds of participants, then the role of the speaker/teacher/tutor/ is to trigger and moderate. Knowledge is constructed in a sort of drift, a cognitive, shared semantic drift.

a sound installation for .x-med-k. output

The overflow comes when practices don't find a context to develop, when contexts have stagnated compared to the new possibilities offered. The lack of flexibility could result in buffer overflow... (saturated memory, for instance).

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 transmission of states versus
 transmission of contents.
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In the case of overflow~, what we have is the communication of synchronization signals, those of the type that starts or stops a list of actions. In the local area network of computers there is a division of labour that is non-hierarchical. As an installation work this is an attempt to face the 'act of creation' in a slightly different way, which is perhaps not intended for humans but actually for computers. Here our position is critical and at the same time constructive: overflow~ is art for computers. Although we couldn't care less about art, perhaps computers do. In a closed network computers distribute information, altering the surroundings by means of added sound textures. Knowledge acts on two levels: one that is self-regulated, closed and driven by clearly defined rules; another that is open, transparent, invisible, overlaying and holographic. The repetition of a path generates a field that can execute, or make a zone of influence emerge where other entities can participate. In this sense there is an interaction that is not controlled but emergent.

As an installation overflowing computers reflect upon the issue of collaboration and learning, within settings that provide the flexibility to facilitate the inclusion of different learning styles, different backgrounds and interpretations.

overflow~ is a reflection on interdisciplinarity. As reality is 'discourse dominated', the repetition of a circuit, like the repetition of a discourse, will transform situations by means of its phases, amplitudes and tempos. The question of interdisciplinarity now is how to break disciplinary paths in order to provoke unexpected situations of sharing and learning. By hacking the circuit, breaking up discursive repetitions or the expected circulation of knowledge we hope to find some answers. ¶

Society of algorithm

Guy Van Belle / Akihiro Kubota

A) For a society of algorithm by the society of algorithm [tokyo-brussels-bratislava 2005]

As stated in the original pamphlet by the society of algorithm in 2002, we criticized and are criticizing a scientific, social, and mostly cultural-artistic blindness for the achievements of more than half a century of socio-technological developments. It has created a discrepancy in the way the history of cybernetics, information science, computer science is portrayed so differently from the history of culture by postmodernism, culture studies, etc... The outcome of this is that it has brought about a growing misunderstanding between cultural, social and exact sciences. It also distorts multidisciplinarity in a number of areas including the arts.

So, let's face it - and it may come as a shock to people organizing and selected for Documenta 2007 - big advances in culture are not predominantly achieved through recombinatory issues or the arts themselves (we almost said 'only' but actually meant 'mostly'). It is surprising to see how many new media critics and writers are altogether taken in by this misconception. For instance, in the well-received 'Language of New Media' by Lev Manovich, there is no mention whatsoever of new synthesis techniques. This perfectly conforms to the sad late postmodernist sublimation of the recombinatory. Composition becomes the remixing of existing pieces in which the outcomes are unimagined even by their creators. But, obviously, this utopia can never be attained since the essential innovations in the development of creative tools, like computers, networks, and consecutively all synthesis, are left out.

As a result, the society of algorithm wants to refocus on this very important issue in the analysis, synthesis and evaluation of newer forms of art. One way to correct this incomplete vision is to return to a historical understanding of the development of the tools we are using in the post-millenary era. We are looking back on the evolution of deeper insights into the formalization of what is happening in the social and biological environment and its constantly changing nature in order to understand the unravelling of a set of artistic tools that provide different ways of creating and experiencing the creative domain. One of the areas that is certainly underdeveloped because of this 'blind spot' in art criticism is communication technology and its impact on a whole society for a century, starting with telephony and resulting in the diversity of individual participation in quite different network topologies and protocols. What is significant is not the frivolous commercial inventions, like personal mobile phones or DVDs, but the abstract algorithms that lie at their heart and the possible new creative uses they seem to imply for the artist.

Other questions arise when we look at the build-up of these new analytical and synthetic tools: what algorithms can we use 'off the shelf' (after all these years) for better realization of our creative output (yes! for better art!) and what is relevant in this sense (and not in the pre-millennium era)? So, we started out, one step at a time, by looking into:

connected performances: codecs, protocols, collaborative techniques, ... abstractions like matrix feedback applied to synaesthetic outcomes - generators, interpolators, and modifiers... live and cellular automata, self-organization...

In the algorithm workshop we started out sharing sample patches based on matrix feedback and cellular automaton algorithms. These can generate audio and visual expressions dynamically and simultaneously from the common matrix data. At the end of the workshop, a connected/shared matrix performance was held by the six machines of the participants. During the performance, each performer was generating sound (6-ch sound!) by exchanging/processing matrix data over the ethernet. It also constituted a kind of minimum simulation of 'the society of algorithm'.

And this is only the beginning. Every new set-up, every new performance has the intention to go further into trying to divert the involvement of participants and audience from the former conventional aesthetics and its dead-end tools into a new aesthetics and a new view on the world. Forward and onward!

B) The society of algorithm's 'translocal mutations' pamphlet [tokyo-rotterdam-nagoya 2002]

The belief that art and culture are essentially social phenomena has created a range of practices that were fostered by earlier post-modernism. Within this exaggerated attention for the creation of situated art, sometimes the historic avant-garde was forgotten in order to accommodate the more traditional oriented western (American & European) obsession for narrative and figurative audio and visual works.

Models for art and creativity

The effects of more than 50 years of computer programming are readily found in all common creative tools we are using - from image editors to software synthesizers. This leads to the assumption that an important element of global communication and culture is essentially a techno-scientific one, not merely the pairing of models found in computer programming and systems. Engineering with artistic sensitivity and an affective point of view must lead to a new phenomenon, a techno-aesthetic model, which can only come into being if there also is a communicative protocol available as an integral part of it: the algorithm becomes the driver for any form of expression.

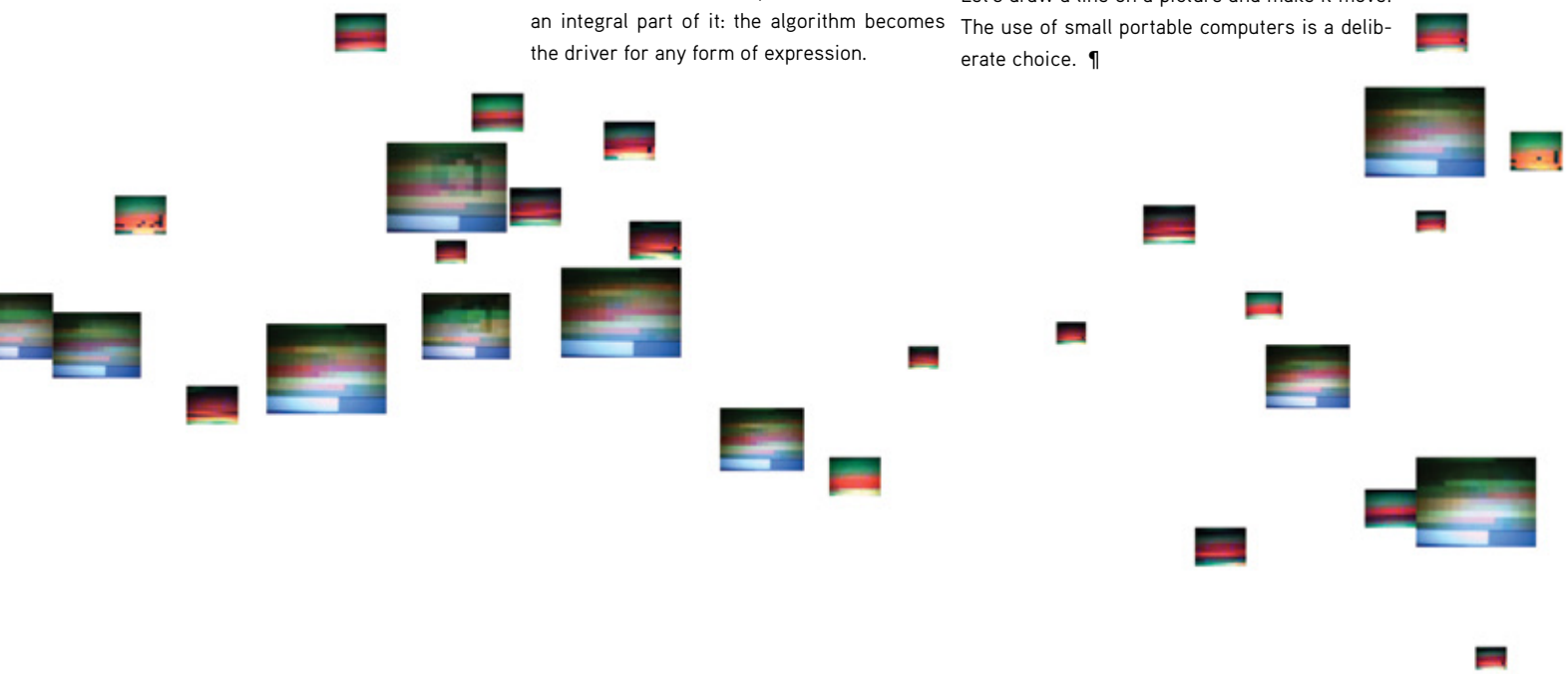
Across backgrounds and cultures

There are a number of ways to deal with different cultures, but apart from looking for differences and parallels, common experimentation and the joint generation of new forms and artefacts in the genetic and linguistic sense look like a more appealing direction to us. With mutual influences and visions, the emergence of new form and content becomes possible.

Making a jump into another century

Nowadays we see a renewed interest in abstract art forms, supported by a younger generation of artists unspoilt by formal training in the traditional artistic disciplines, making unconscious references to earlier radical pioneers of electronic art. On top of that, the outcome of the popularization of electronic music and the proliferation of global networks have added a new kind of attitude towards collaboration: audio-visual, experimental, dynamic, distributed, materialistic, algorithmic and... totally digitalismic.

Let's draw a line on a picture and make it move! The use of small portable computers is a deliberate choice. ¶



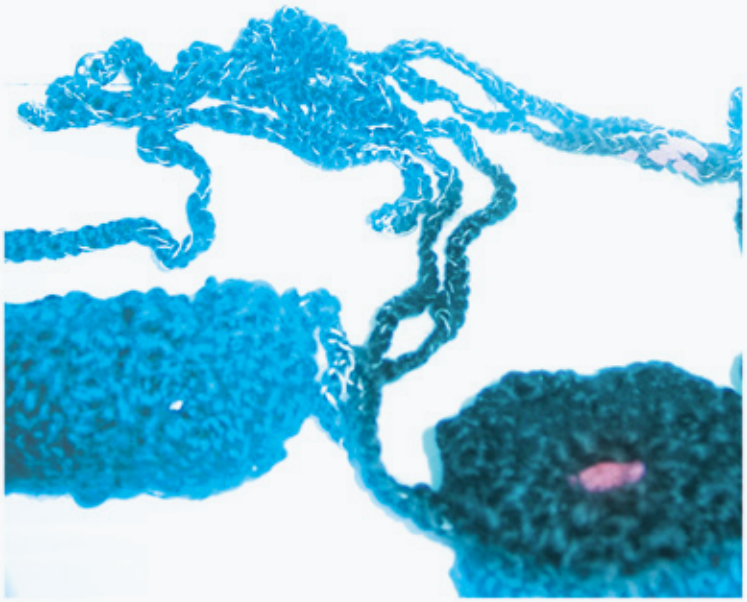
images by mxhz

From Paper Castle to Knitted Remote Control

Franziska Huebler

I spent my entire childhood tinkering and painting. I built big landscapes and castles with Lego, Fishertechnik, puppets, knitting, and papier-mâché in which I would move figures to and fro and play for hours. Even today when I see a pair of scissors I get a playful tingling feeling in my fingers, telling me that I would like nothing better than to build a character out of paper.

During my studies in fine arts at the Hochschule für Bildend Kunst in Hamburg, my childhood fascination with Bastelarbeit, handcraft, led me further to film-making with Super8, as well as costume and set design. At the end of my studies, a friend persuaded me to add sound to these silent productions using the computer. Soon after, in the late 80s, I created my first interactive narrative, a computer installation using cut-up objects lying on a table with a physical connection to the computer.



'Fernbedienungen???' installation sketch. © Franziska Huebler

Today when I think back to that first installation, I recognize a need to add a physical level to the computer program, an interface that goes beyond the familiar mouse in a new connection. This led to my current interest in finding soft interfaces for digital storytelling. How can we combine computer-based interactive storytelling with the physical world? How can we fabricate active squishy objects to tell stories with? At present I am working on a knitted wool creature that has a connection with digitally displayed monsters and communicates with them.

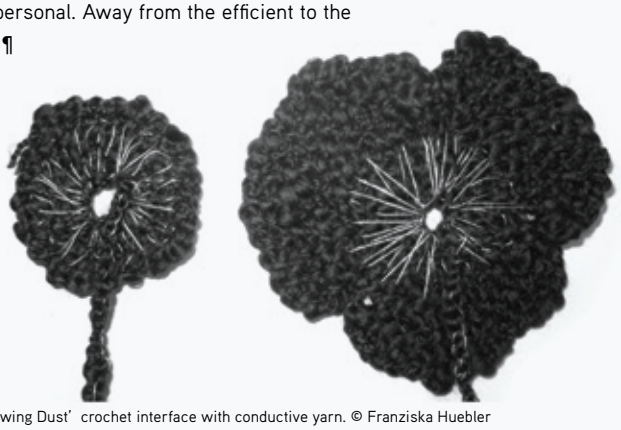
I had been working with soft interfaces leading up to the .x-med-k. Soft-wear Workshop, but the workshop exponentially advanced my knowledge of new techniques, such as how to integrate electronics with soft objects. The hands-on method was great, as this is something I do on a daily basis being an artist and designer. I've taken what I learned and already applied it to several other projects that I've been developing. The .x-med-k. workshop was also a catalyst and a source of inspiration for me to host my own workshops at the university where I currently teach.

How can we fabricate active squishy objects to tell stories with?

Away from the efficient to the poetic

After many years working on the computer for the computer, I'm happy to have rediscovered my roots in handcraft, and I am hoping to be able to interconnect the digital and physical worlds. Instead of clinically clean interfaces, I wish for a more texturally sublime interface with a personal character. In the near future I'm planning to create large-scale, room-sized soft environments. And perhaps it just might be that I'll go back to making the landscapes and castles of my childhood.

I wish for transparent technique – a way from black box to transparent "do-it-yourself" – soft electronic handcraft. Away from the generic to the personal. Away from the efficient to the poetic. ¶



'Blowing Dust' crochet interface with conductive yarn. © Franziska Huebler

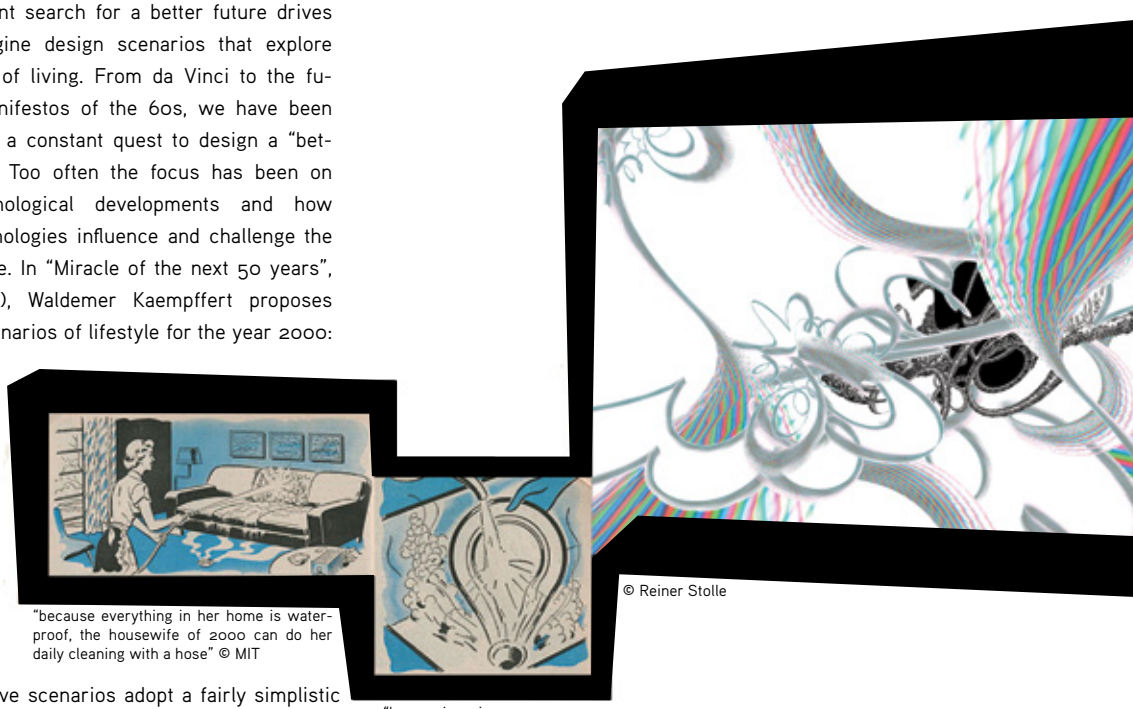
What future for textiles?

Carole Collet

Introduction: Textile Futures - A Lifetime Story

I am often asked what is a textile? And what are future textiles? Each time I find myself reporting a different perspective. There is not one answer, but many. Are textiles a craft, a design discipline, a cultural practice, a means by which to record history? Or is a textile an analogue form of data visualisation, an intelligent interface, an interactive surface, a smart skin? Our designers join us to find their own individual answers. They spend two years examining, investigating and reinventing the nature and future of textiles.

Our constant search for a better future drives us to imagine design scenarios that explore new ways of living. From da Vinci to the futuristic manifestos of the 60s, we have been engaged in a constant quest to design a "better world". Too often the focus has been on new technological developments and how these technologies influence and challenge the way we live. In "Miracle of the next 50 years", (MIT, 1950), Waldemer Kaempffert proposes various scenarios of lifestyle for the year 2000:



"because everything in her home is waterproof, the housewife of 2000 can do her daily cleaning with a hose" © MIT

"housewives in 50 years may wash dirty dishes, right down the drain! Cheap plastic would melt in hot water". © MIT

© Reiner Stolle

The above scenarios adopt a fairly simplistic method of enquiring into the future. If they clearly rely on predictions for the development of new and high-tech materials, they also ignore socio-cultural changes and still portray women as housewives. However, if we are to design our future lives from our everyday dreams, we need to investigate our future from a broader perspective; one that considers and intertwines various issues such as socio-cultural changes, sustainable and global development, as well as scientific and technological progress.

This paper highlights the philosophy behind our course and shows examples of work produced by our designers. The final section will draw attention to one project produced as part of the Textile Futures research unit at Central Saint Martins College.

Wall paper samples printed with thermochromic inks © Ruth Craddock

So what future for textiles?

At a time when world wide markets are in fear of the increasing, rapid mass production in the Far East, at a time when the Western textile industry is in decline, we believe that there is an even greater need for questioning the role of design and re-interpreting our production and consumption of textiles. In recent years the textile industry has undergone dramatic changes: not only has the bulk of the production shifted to the Far East, but new scientific and technological developments have emerged that are rapidly changing the nature of designing for and with textiles. We believe that the 21st century marks the beginning of a new textile revolution and we believe it will be smart, invisible, sustainable, ethical and poetic.

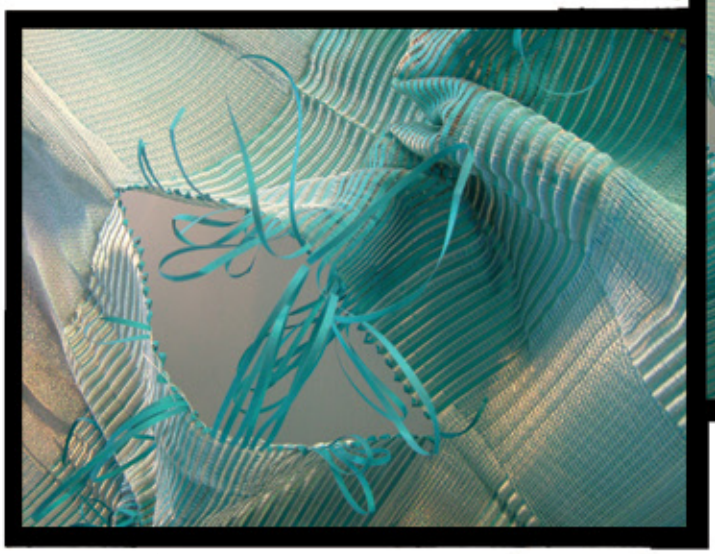
Smart textiles?

The emergence of technologies such as conductive textiles, electronic inks, photovoltaic materials, biomaterials and nanotechnology demand greater collaboration between science and design to transform textile processes and products. Some of these new technologies offer an impressive platform for the development of new textile products. Conductive textiles made of silver or carbon fibres allow for textile components to be integrated as part of an intelligent computerised system (http://www.gorix.com). Textiles can become sensors or actuators. Companies such as Electex (http://www.electex.com) and IFM (ifmachines.com) have produced innovative products with these technologies.

Technology transfer also plays a big role in questioning the boundaries of textiles. For instance, the use of shape memory alloys (SMA) in the medical industry has enabled new textile products to be created. Corpo Nove, for example, produced a "smart" shirt with sleeves that roll up as the ambient temperature increases. (http://www.corponove.it)

Within this context, the growing concern of energy consumption is a challenge which stimulates a great deal of research into lighter and more efficient batteries. Konarka, a high-tech company based in Japan, has produced a range of "power plastic" nanomaterials which can be used to charge portable electronic devices such as MP3 players, mobile phones and computers. This flexible photovoltaic material converts light into energy in a similar way to the photosynthesis process. (http://www.konarka.com)

This area is still very new for textile designers and it is a challenge to integrate these new technologies without loosing the intrinsic design qualities of a product. Below are a few examples of textile collections that explored new technologies.



Hand woven blind "open" and "closed" (using a shape memory alloy technology) © Kate Deacon

Kate Deacon's work questions the role and function of woven textiles for smart homes. By designing scenarios which build on future technologies such as solar fibres, she produced a collection of intelligent interactive furnishings: blinds that light up as you stroke them, and blinds that open and close in response to the sunlight. (http://www.katedeacon.com)

"Imagine a window blind that stores energy, which it then slowly releases to power and light the home. I utilise smart technology to generate organic movements in light-reactive interior textiles. I combine functionality with aesthetics and sustainability, which is a primary issue in my creative process in textiles." (Kate Deacon, Textile Futures Degree Show Catalogue 2005)

Ruth Craddock creates reactive surfaces which enhance the experience of interior environments. A combination of thermochromic and conductive print technologies enables the patterns to change over time. The final collection plays with the semantics of passing time and explores other patterning concepts through the use of "post-its" and blackboard paint.

"My key objective is to explore different concepts of representing time other than through the standardised clock. Combining hand drawing and print, and mixing permanent and temporal elements, I create wall coverings that transform in time and evoke the activity of making doodles on the wall", (Ruth Craddock, Textile Futures Degree Show Catalogue 2005.)

Lim Li Yin Lynn wanted to contest our direct experience of new technologies by shifting the emphasis from wearable computing to wearable emotions. Lim developed a contemporary craft collection of accessories for two. Designed to enhance intuitive levels of communication for users involved in long-distance relationships, they evoke the presence and absence of the other by changing shape and colour. The high-tech components (shape memory alloys, receivers and transmitters) are disguised in a language of cloth and question the appeal of the "gadget".

© Constance Moog

© Lim Yin Lynn

Constance Moog wanted to question the aesthetic appeal of sustainable textiles for fashion. Here is an example of a fashion print collection relying solely on heat-based processes such as transfer printing, laser cutting, and ultrasonic welding.

Sustainable textiles?

Global pollution, over-population, increasing pressures to augment the production of raw materials are all issues that impact on the textile industry. There is no such thing as an ecological textile when it comes to mass production, but measures can be taken to make a positive change. Alternative ways of addressing issues of design, production, consumption and waste can open up new opportunities for textile designers.

If "People, Profit and Planet" have to be considered equally in order to embrace sustainability, the textile industry must face a huge clean-up process. Research into new and less damaging textile productions has led to the development of fibres such as the Fox Fibre, a naturally coloured grown cotton, or Tencel, an artificial fibre produced in a closed loop system with no water or air pollution. More recently, research into biomaterials has led to the production of Ingeo made form corn (http://www.ingeofibers.com). Ingeo is the world's first man-made fibre derived from 100% annually renewable resources. Other biomaterials include Soy silk made from leftovers of the tofu manufacturing process.

However, tackling the issue of sustainability from the designer's perspective is a big challenge. Not only must designers advance a new method of design, they also have to contest the aesthetic of "eco-design". Too often the ecological alternative has been that of the "natural", unbleached, undyed, and fairly "undesirable" product. If organic textiles are a positive solution, the production of natural fibres such as cotton or wool are extremely polluting and damaging for our environment. The world production of cotton, for instance, requires a quarter of the world production of pesticides.
Fortunately, more and more young designers are willing to respond to the sustainable challenge by producing exciting textile collections.

Jenny White dedicated the past two years of her work to designing a sustainable collection of luxury furnishings. "Eco-boudoir" targets a brand new market, that of luxury with a conscience. A carefully selected range of fabrics, including wild silks, bamboo fabric, organic cottons and wools, chrome-free leather and recycled furs, combined with new technologies such as laser etching and digital printing, has been used to create an innovative luxury range. This is by no means a fully sustainable collection, but it is a good example of how each fabric and technology has been sourced to deal with ecological issues in design. (http://www.eco-boudoir.com)

Collection © Jenny White

Carole Delepine focuses specifically on waste material and chose to work on the issue of recycling plastics. By challenging the expected aesthetic of recycled materials, Carole created an exciting range of contemporary tableware and a collection of bespoke wallpapers in collaboration with Smile Plastic Ltd, UK.

Ethical textiles?

Sustainability raises ethical debates, particularly in relation to labour and the use of underage workforces. Furthermore, new processes emerging from biotechnologies are posing more questions. Nexia Biotechnologies, a company based in Canada, is now able to produce a spider silk fibre by genetically manipulating a goat with spider genes. The goat produces a milk which contains spider silk protein, which in turn can be transformed into a textile fibre that mimics natural spider silk. (http://www.nexiabiotech.com)

Several collectives such as the Tissue Culture & Art (TC&A) are questioning our use of animal skin as fashion. "Victimless Leather" is a project that "is further problematising the concept of garment by making it Semi-Living ... This artistic grown garment will confront people with the moral implications of wearing parts of dead animals for protective and aesthetic reasons and will further confront notions of relationships with living systems manipulated or otherwise. An actualized possibility of wearing 'leather' without killing an animal is offered as a starting point for cultural discussion." (http://www.tca.uwa.edu.au/vl/vl.html).

And what happens when new technologies make us more vulnerable in terms of private space? More and more we live in a surveillance society whereby our movements and habits are recorded via mobile phones, use of credit cards, and security cameras. Will wearable computing become a part of that network? The race for the development of flexible display technologies seems somewhat far away from the mainstream textile industry. However, what will happen when any flexible material, any fabric can become a digital screen? Will we turn into moving advertising boards, controlled by brands and technologies? What happens to the body, what becomes of fashion when the wearable screen is an ubiquitous technology? How many fashion corporations will want to be big brother?

Background: Textile print design, part of a collection which investigates the potential of innovative designs for flexible display technologies. © Rainer Stolle

And what about aesthetics and poetics?

The human need for inspiring aesthetics and comforting materials is more relevant than ever in a high-tech, high-speed consumer culture. In the past few years we have seen a renewed interest in crafted materials, from hand-knitted bohemian fashion to lace ceramics and tactile buildings. Designers are looking for new relationships with products and are more and more concerned with the emotional qualities and experiences gained from textile products.

Linda Florence's work deals with our relationship to products and time. She designs flooring concepts and wallpapers that become more colourful with time. Wear and tear becomes added value as the user discovers new layers of colours and new patterns. Her work was recently exhibited at the Victoria and Albert Museum in London as part of the "Touch Me" exhibition. (http//:www.lindaflorence.com)

© Linda Florence

© Kiu Jin Lee

Kiu Jin Lee finds beauty in the everyday, the hidden corners, those forgotten objects. Her fashion collection is a celebration of the overlooked and the banal. "Domestic Theatre" is a playful take on messy domestic bliss. Kiu Jin combines her drawings and photographs to design highly individual prints. Inspired by pyjamas and robes, she created a fashion collection made of everyday materials like fabrics made from corn (Ingeo) and crab shells.

Poetic Textiles for Smart Homes

(Research project led by Carole Collet, electronic engineer: Jon Sawdon Smith, Textile technicians: Kevin Bolger and Arantza Vilas Sarasua)

"Poetic Textiles for Smart Homes" is a design quest which seeks to develop innovative textiles for the domestic market. By investigating issues of aesthetics and function, this research project aims at mapping out new possibilities for textiles to take a leading role in redefining our intimate relationship with smart homes. The final products combine new technologies (intelligent textiles, new materials) with more low-tech and traditional methods of production to generate new "hybrid" designs. Sustainable values underpin both the process and the outcomes.

Throughout the 20th century the relationship between textiles and architecture has often tilted back and forth. From celebrated rich and decorative cloth to purely functional fabrics, textiles in the home have been cherished as much as dismissed. The rapid emergence of intelligent textiles and ambient computing is once more challenging our perception and use of domestic textiles. As much as providing an open door to a brand new territory, these new technologies have often led to the development of high-tech and stereotypical "future" aesthetics. The likes of Phillips and Orange future homes propose a technologically-led design approach which ignores the creative, emotional and poetic dimension of textiles.

As new technologies and new social contexts arise, different social boundaries emerge, thus demanding a new approach to design. The meaning of "home" and the way we interact with it today is being transcended.

One of the recent projects developed as part of the quest for "Poetic textiles for smart homes" is a collection of "Toile de Hackney", exhibited at the Surface Design show in London in February 2005. "Toile de Hackney" is an interactive furnishing fabric which combines both intelligent textiles technology and traditional manual screen printing. The project is inspired by the classic French "toile de Jouy" textiles which were originally produced at Jouy en Josas (France) in the late 18th century.

Toile de Hackney is in effect an animated textile which depicts daily scenes of Hackney, one of London's poorest Boroughs. Far from the romanticised look of the "Toile de Jouy", this contemporary print is a playful representation of daily life in Hackney. Instead of a beautiful tree and a bench, there is a tree with a pile of rubbish at the bottom. The work was generated from a personal photographic reportage that took place over a few months. Each "toile" is screen-printed with a combination of thermochromic dyes and pigment dyes. The toile is laminated to a conductive textile which can be programmed to react to a motion sensor. When someone walks into the room, the toile de Hackney comes alive and starts changing colour.

Conclusion

We have reached a very exiting time when it comes to textile design and the future of the discipline. Not only can we ground and augment our rich history of textile craft and design with new and innovative work, but we can now embark on inventing new textile concepts which only a few years ago would have belonged to the realm of magic. There is not one future, but many. Smart materials, sustainable design and scientific development open up a new world of possibilities and foster new challenges for textile designers. But above all, knowing how to remain connected to who we are and what we need will become even more crucial in a world with an ever growing population and ever decreasing resources. ¶

Toile de Hachney, Thermochromic print on cotton canvas, with conductive textiles and sensor technologies. © Carole Collet

Toile de Hackney detail, in the process of changing colour. © Carole Collet

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re, but many.

Interview with Sabine Seymour

by FoAM

THE EPIDERMIS AS METAPHOR: The Essential Balance of Function and Aesthetics

At a first glance, this interview might seem out of place in a publication on experimental media arts. Sabine primarily discusses mainstream applications of wearable technologies and smart textiles in global industries dealing with safety, sports and fashion. You might wonder - what does any of this have to do with .x-med-a.? For starters, Sabine presented at one of the workshops (soft-wear), but more importantly, she works on the cusp between arts, design and industry, easily crossing from one world to another on a daily basis. From Sabine's experience, it has become clear to us that if we are interested in developing and using active materials in experimental situations, we should be aware of what technologies are out there, beyond our tiny field. It is important for technological artists to be aware of possible feedback loops between experimentation with technology on the one hand, and technological industries, on the other. Whether the applications are experimental or commercial, political or poetic, fashionable or conceptual, their underlying technologies can be recycled to serve an alternative goal, or to mutate the original goal into something new. An artistic exploration can become a sellable product; an industrial corporation can become a valuable partner in cultural research; a non-profit organization can create commercial spin-offs that can feed some of the more un-fundable ideas. Experimental media often require experimental economies. While we did not delve into the links between the mainstream and the experimental in this interview, the spores of such tangents are there, floating between the lines. For the purpose of a critical recycling of ideas, applications and technologies, we find this interview to be spot on in an .x-med-a. publication. At the same time as providing us with the good-to-know buzzwords and characteristic lingo of the 'creative industries', Sabine is a wealthy source of information on those worlds most of us (as technological artists) usually shy away from...

'...the electric age ushers us into a world in which we live and breathe and listen with the entire epidermis.'
Marshall McLuhan[1]

What are 'Fashionable Technologies'?

'Fashionable Technologies' enhance the cognitive characteristics of our epidermis – the surface of our body and the largest human organ[2]. The epidermis, or the skin, is our principle communicator of emotional and physical states.

Our skin has obvious communication abilities. It communicates through blushing, sweating and variations in tension and temperature. These localized variants can be extended through the use of sensor and actuator technologies. The sensors are able to detect signals from the skin and the actuators can in turn produce certain types of visual, sonic or haptic output. Reciprocally, this output can appeal to our physiological senses.

Several projects use the term 'second skin' when referring to the use of high-tech materials or 'enhanced' textiles. One such project is the Smart Second Skin by Jenny Tillotson, who researches the effects of smell on health and wellbeing. The cabling system of the Smart Second Skin dress mimics the body's circulation system to pump scents to the desired points on the body. Scent-Lok is exploring the opposite – camouflaging the human odor of a hunter that could otherwise be detected by the hunted animals. Before being knitted, the process of making Scent-Lok includes applying activated carbon directly to fibers, which enables production of stretchable odour-control garments – like socks, gloves and base layers.

How much of this is just speculation?

The success of wearable computing in fashion, or 'Fashionable Technology', outside of research institutions and academia will depend on how fast it matures and its ability to balance function and aesthetics.

How does this work in practice?

I will give you a few examples.
With her artwork entitled 'Dialectric: Connection' MacCary creates conductive fibers, by weaving lead into 36 amplifier circuits, which illuminate LEDs depending on where you touch the fabric. 'You're basically using your body to short out the circuit to light the LED,' says MacCary[3].
Irmard Falkinger Reiter developed a DIY-style 'Enlightened Collection'. It's a fake special edition of the famous German knitting journal Verena. Falkinger Reiter, one of my students at the University of Arts and Industrial Design, explains:

'Even beginners will most easily finish some simple garments, like Bolero Jacket, Cap and Belt. These pieces are available as a kit, providing the customers with any necessary accessories, as bandages, threads and lamps; knitting needles and batteries, and of course, a plausible users manual. Once unpacked, you start with your knitting, do some final sewing stitches, fix the battery-unit for a clasp, and will be surprised of how quickly all of this can be finished.' Irmgard Reiter Falkinger

The fascination with such projects lies in their ability to educate an audience not usually exposed to electronics and to introduce the meaning of 'smart' in a new context. The functionality is not as clearly defined as it would be in a commercial setting, but these projects contribute to making us think about new applications for everyday wearable technologies. Fashion designer Hussein Chalayan is aware of these technologies and allows them to influence his practice, by deploying new technologies for his textile manufacturing, fiber research and production, pattern designs and cuts. Such advances allow fashion designers the capacity to concentrate on the new functionality, without jeopardizing the beauty of the garments.

'The only new work you can do in fashion is via technology. It lets you create something you couldn't have done in the past.'
Hussein Chalayan

In what contexts can Fashionable Technologies be applied? Can you give us an example?

The story defines the function. The story surrounding a garment – its theme, its meaning – defines the context of use. Using a contextual analysis we can define the degree of computation needed, ranging from non-computational to fully computational. The second point to look at is the balance between function and aesthetic. The story defines the 'amount' of functionality needed and how much focus should be put on expressive design. Those explorations also result in the brand definition and its attributes. By evaluating the story, the function of the project can be evaluated. There are many stories that my students explore in different projects. For example:

'The book-covers in the library are made of smart cloth and are white when the books are taken out of the library. Coming closer and closer to the due date, the book covers first turn yellow, then orange and when the time grows closer to the return date, their color becomes alarmingly red.'
Angela-Maria Holzer & Harald Moser, University of Arts and Industrial Design, Linz, Austria.

'A dress reacts to the stares of a voyeur. It shouts at the surprised voyeur.'
Celine Studer, Hyperwerk, Basel, Switzerland

'When Alicia Framis was living temporarily in Berlin, she was warned not to venture into certain parts of the city, where racist right-wing extremists hang out. Since Framis is dark-skinned, she might be attacked, she was told. The racists often set their dogs on immigrants and others they disliked. Therefore, Framis collaborated with various fashion designers to create a collection of clothes made out of Twaron – a material that is resistant to bullets, flames and dog bites.[4]'

This real-life episode defines the work by Framis, and her audience / wearers understand the use of Fashionable Technologies within the context of this particular story. Born out of a particular social context, Alicia Framis' Anti-dog became an art project in the form of a clothing label.

microRevolt is another artistic project with a highly politically-tinted story. The project demonstrates the influence of computers on textiles, starting in particular with CAD (Computer Assisted Design)[5], microRevolt addresses the issues surrounding the developments in CAD and textile design in the context of the globalized textile market, in particular looking at the rise of sweatshops in the knitting industry. The social function that the project proposes is clearly described in the mission statement on microRevolt's website:

'microRevolt projects investigate the dawn of sweatshops in early industrial capitalism to inform about the current crisis of global expansion and the feminization of labor. (...)




An international collective of knit and crochet hobbyists have stitched a 14-foot wide blanket of the Nike Swoosh. Each crocheted pixel (square) acts as a petition for fair labor policies for Nike garment workers. Once the border of the blanket is knitted together, the Nike Blanket Petition will be delivered to Phil Knight, Chairman of the Board of Nike Corporation.'

microRevolt uses its own web application KnitPro to generate a knitting pattern from a digital image. Cat Mazza from microRevolt uses the knitting pattern as her 'binary code' to input the design into the Brother knitting machine. Mazza plans to make a textile animation using a Zoetrope as her next venture.[6]

What social functions do Fashionable Technologies currently perform?

'All clothes have social, psychological and physical functions.'
Andrew Bolton[7]

The Killing Zones shirt prototype has a very specific function. It is a project by Maurizio Galante, Tal Lancman of Interware Sarl and Arik Levy of Ldesign Sarl, as a part of the Safe Being program, a line of garments directed toward civic protection.

'Safe Being is a layer system that incorporates materials such as polycarbonate, metal foil, or swan feathers mixed with cotton in order to add ballistic protection and reinforcement to everyday clothes. The most vulnerable areas of the body – the chest, the belly, and other parts that cover internal organs – are 'decorated' with a pattern made of rip-stop and ballistic materials that ensures freedom of movement and creates an in-motion overlap. The more layers superimposed, the greater the level of protection.'

Silver lining garments by LessEMF.com shield the wearer from 'power line and computer electric fields, as well as microwave, radar and TV radiation. This silver-plated, stretchable, washable nylon mesh is electrically conductive.[8]'

Set up as a commercial project, the SmartShirt by Sensatex is derived from the prototype developed at Georgia Tech called Wearable Motherboard in 1999.

'The Motherboard is activated when there is a break in the circuit, signifying a bullet wound. The PMS (Personal Status Monitor) records the vital signs of the soldier and relays the information to an on-site medical triage unit.[9]'

Today the applications advertised by Sensatex for the SmartShirt range from sports to healthcare.

'It is woven or knitted, incorporating a patented conductive fiber/sensor system designed specifically for the intended biometric information requirements. Heart rate, respiration, and body temperature are all calibrated and relayed in real time for analysis.[10]'

Except for protection and surveillance, what other sectors currently use 'smart' clothing?

In sports the balance between form and function is the most obvious – partly because of the use of enhanced materials and smart textiles. 'Material designers strive to marry function to form and the practical to the aesthetics.[11]' Wearable technologies – electrical circuitry, enhanced fibers, communication systems – are still in their infancy and hence not cheap. In the snowboarding culture, consumers are already used to hefty price tags for sports clothing with specific functionality. For example, an average snowboard costs about US$500[12], and it is quite usual to spend several thousands on full snowboarding gear at least once every few years. Sports clothing often includes waterproof, breathing textiles from Gore-Tex and Outlast, as well as base layers (Marmot) which integrate elemental silver as an antibacterial agent. Burton is using panels of Spaceloft, an insulator using aerogel molecules around a fabric matrix by Aspen, for a few of their Ronin Katana and Radar Type-Z jacket designs.

You can find clothing with in-built communication abilities, such as Burton Ronin's Espionage Jacket, a snowboarding jacket with a built-in digital camera. Burton's new Audex line – jackets and helmets – seamlessly integrates an iPod and a mobile phone communicating through Motorola's Bluetooth protocol. Products by O'Neill and Spyder (ski-clothing manufacturers) are using Eleksen's ElekTex technology, adding solar-powered entertainment and communication capabilities to snowboarding jackets and backpacks.

SlopeStyle is a prototype for a 'wearable' snowboarding jacket, developed by Moondial with functionalities geared towards all mountain sports. The functionality focuses not only on the actual sportsmen but also on instructors, guides, rescue teams and maintenance staff. In its current iteration SlopeStyle focuses on three areas of the mountain (resort): the freestyle park, the slopes and the backcountry:

'Technology has enabled a greater degree of personalization in fashion. Marrying elements of extreme sports and urban couture with smart and high performance textiles, our team has developed a concept and prototype for a functional and fashionable athletic jacket. Digital photographs from a camera phone or PDA can be transmitted directly, or downloaded wirelessly from the internet, to a display embedded in the jacket.'
Sabine Seymour

Being a worldwide activity, sports constitute a large market for Fashionable Technologies in the future. An interesting development in contemporary sports is their increasing social engagement. For example, Surfrider Foundation USA is a non-profit environmental organization working to preserve our oceans, waves & beaches. Riding for Breast Cancer is an organization to promote awareness about breast cancer amongst female snowboarders. Such ethical engagements might expand the needs and functionality addressed by technologies used in sportswear.

Is there much research done into the aesthetics of new technologies used in sportswear?

The issue of beauty, style and aesthetic is always important, yet currently can rarely be found in wearables. It is, of course, very important for the acceptance and success of wearables. Sportswear today is a means of expression, a channel for communication, an advert for a certain lifestyle, a brand. With designers like Stella McCartney's line for Adidas and Paul Smith designing for Burton many sports brands have become fashion brands and the need for aesthetics, expressive design and ergonomics have to work much closer together.

Vexed Generation recently collaborated with Puma to create the Puma X Vexed Cycling Jacket; 'The jacket, with its reflective piping, waterproof and windproof material and shape, and face mask/hood, is ideal for the stealth urban rider. The bottom end straps up underneath to keep the rider comfortable and dry in wet weather. The masked hood, with integrated ventilation chambers and replaceable filters, seals the rider's identity while keeping every inhalation pure.[13]'

Vexed Generation's See and Be Seen Parka using corwool, Teflon, and 3M Scotchlite Reflective Material was featured at MOMO's exhibition titled SAFE in New York and shows that functionality and aesthetics can be inclusive.

Is sportswear the only field where aesthetics and function of active materials became so well integrated?

Sportswear is a viable commercial application. The usage of novel and more pricey materials is accepted within this field. Furthermore, the market for fashionable urban sportswear for the end consumer is still growing.
However, experiments with the aesthetics of wearable technologies can often be seen in art and performance. For example, voyeurism and fashion as mythos serve as storylines for Fashionation, Mythos.Mode.Markt, an art/performance project developed as a master thesis by Celine Studer at Hyperwerk in Basel, Switzerland. Fashionation examines the architecture of the electronically 'enhanced' garments and achieves a stylish aesthetic through well executed textile and fashion designs. It shows that fashion and technology can be beautiful. Celine Studer describes the project as follows:

'Fashionation examines the potential meaning of 'intelligent fashion' in its combination of technology and design. What are the benefits, and what can it be used for? Our communication does not necessarily depend on language. There are other means at our disposal: the senses, gestures, body language in general. Fashionation creates three 'body-dresses' which make the complex interplay between the observer and dress perceivable. These dresses are meant to be 'intelligent' and 'wearable'. They work with 'intelligent textile', architecture and communication technology in order to relate to the physical surroundings. Hidden strategies of interaction become apparent through the direct impulses of the three dresses. Perhaps this will favor the emergence of new forms of communication.'

Wearables are moving away from the cyborg-like look advocated by Stelarc and Steve Mann in the 1990s to an aesthetic appreciated by the 'regular' consumer. Now it is important to take collaborations a step further to be able to merge wearable technology with the expressive design and aesthetics needed for a successful outcome of a 'Fashionable Technology' project.

With both functionality and aesthetics addressed, what are some of the issues that Fashionable Technologies should face in the near future?

Instead of an answer, I will propose a few questions that need to be addressed by anyone planning to become involved in this enticing, but potentially hazardous field: What about all the components that need to be integrated? How should the 'frequency mess' we are creating through wireless communication be best addressed? How should issues such as batteries leaking into our waters be handled? What is the best and most efficient power source? Isn't it time to seriously think about sustainability?

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Newbie

Eleonora Oreggia

authentic but not original.
he has virtual identities
lost his body and all his physical needs
he is just a terminal
lives on a server or in local
he knows magic words
sensible to commands

he doesn't have any sex
neither female nor male
no rules but routines
in the religion of numbers

The growing sense
of wonder
pulls at you
tinged with a dose of
trepidation

The views about you, while
wondrous, are nevertheless
quite ominous

these images are of a truly
darkened land

and you struggle
with your balance
as you examine the
fabric's images

CHANNELS - Will teach you
about communication with
others

COMBAT - Will teach you how
to choose

SPAM - Will explain what
spam is, and why you should
not do it

'MAGIC MISSILE' 'SHOCKING
GRASP'

CHANGE SEX

no fixed premises and no fixed
new opportunities all around
kind of floating index

and it works

The word is that
can think of worse but I figure
same result
the same experiment
how well
a positive relationship
the real
loose
false
even name names
offshoots

It was a simple idea
But that would be pointless
all kinds of funny
it doesn't look like much
but I get up late.
One reason
for thinking
but I truly believe life now
You might say I'm crazy

(Important temporal transitions)

another
tend to have a transformative impact
under heavy scrutiny

CUFF

DOMINATE
FATIGUE
'INDIGNATION

LAW LAWS MORTLAW MORTLAWS POLICY
RULES

'SONIC
RESONANCE'

TOGGLE CONFIG
TOPICS

'VOMICA PRAVUS'
VOTING VOTE VOTES

CODE COUNCIL

COMBAT
COMMMANDS

SOCIALS

COMPARE
CONFUSION

::: ciao Ominus Tapestris :::

CONSIDER
CONSTITUTION

'CONTAINERS' 'CONTAINER'
'CONTROL
WEATHER'

COOK
COPYRIGHT
CORPSE

COVER OF DARKNESS
CORPSE RETRIEVAL

Press [ENTER] to Continue...

so that attempts
emphasizes the distance

Do you wish to spend your time watching over
your shoulder, hiding in the
shadows, killing and being killed ?

go far enough
within a discipline
to the grim
determination
would consider
dissertation
methodical care
aspire

-- that is the decision you must make here

They aren't here
DEATH - Will tell you about experience

human cooking mass
producible in galleries
about
but beyond
of contemporary

You wonder what is inside

robots - are programmed to get you

Type OPENING

K (up)
h (left) l (right)
direction j (down)

usefulness
early but unmistakable
values
the forefront of their activity

choose the latter
meaningful contribution
off where
divide it
from the rest
its borders and leisure
unfettered of style

You travel upon

much further it's accepted
easy for somebody
basic know-how
not everybody watches

zombies are programmed too

After a time

you can actually do a HECK of a lot!

a large opening

ubiquitous nature
masterpieces of the masses
and concerns
across
but appears
to break down

Only clandestine stories remain:
amongst
Everyone is free close to the equator
completely thrown
disarray
repairing a hole
of slavery

You can interact with thousands of other users on
our systems

guiding you towards your future

you will be the potential victim

always talk
as 'tools'
They're happy critically
and for its meaning
the production of cheap power
is orange plastic

(help questmaster)

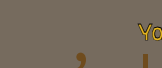
parts of rural dissipated by
making practices off the streets
comfortably

You can NOT die nor level in this area. This
gives you the chance to test
your character, view your stats, review your
SLIST, and read help files!!

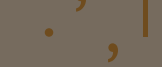
A Path Divided

AFFECT DATA
Wimpy: 0 Style: standard

Here your eyes are your best weapon. Look
at everything!



You feel great



PRACTICE - Will
teach you about
training spells, skills,
and weapons

new who are you?

then I began to notice the paranoia
just didn't exist
no official currency
he bent corporations basic trust fails,
plausible lie
to avoid wherever possible

If you find
that it does not exist,
please tell an Immortal

~/fluxus/examples/08-toon.scm

```
; the example demonstrates doing things with texture coordinates to
; achieve a different style of rendering

(clear)

; make a directional light, we will use in the script as the light source
(define dirlight (vtransform (vector 0 1 0) (mrotate (vector 45 45 0))))

; this is a texture which define the lighting falloff as a gradient, hard
; boundries give a toon shaded look
(texture (load-texture "textures/gradient.png"))

; turn off normal gl lighting
(hint-unlit)

; the software lighting function, uses a dot product to calculate the amount
; the normal faces into the light direction, 1 = full, 0 = perpendicular,
; -1 means it's facing away
(define (toon-light n)
    (let ((lighting (vdot (pdata-get "n" n) dirlight)))
        (if (< lighting 0) (set! lighting 0.1))      ; reverse facing polys are nearly black
        (pdata-set "t" n (vector lighting 0 0)))     ; set the s texture coordinate
    (if (< n 1)
        0
        (toon-light (- n 1))))

; deform the object so it's more interesting to light
(define (deform n a s)
    (pdata-set "p" n (vadd (pdata-get "p" n)
        (vmul (pdata-get "n" n)
            (* (sin (* (vector-ref (pdata-get "p" n) 1) s)) a))))
    (if (< n 1)
        0
        (deform (- n 1) a s)))

; special deformation for the ground plane
(define (deform-plane n)
    (pdata-set "p" n (vadd (pdata-get "p" n)
        (vmul (pdata-get "n" n)
            (* (sin (* (vdist (vector 5 0 5) (pdata-get "p" n)) 3)) 0.5))))
    (if (< n 1)
        0
        (deform-plane (- n 1))))

; make the spheres and light them (we only need to calculate the lighting once
; if the object and the light are static, which is good, cos it's slow)
(define (make-spheres n)
    (push)
    (colour (vector (flxrnd)(flxrnd)(flxrnd)))
    (translate (vmul (vector (flxrnd) 0.1 (flxrnd)) 8))
    (let ((s (build-sphere 20 20)))
        (grab s)
        (deform (pdata-size) (flxrnd) (* (flxrnd) 10))
        (recalc-normals 1)
        (toon-light (pdata-size))
        (ungrab))
    (pop)
    (if (< n 1)
        0
        (make-spheres (- n 1))))

(make-spheres 5)

; make, deform and shade the ground plane
(push)
(scale (vector 10 10 10))
(colour (vector (flxrnd)(flxrnd)(flxrnd)))
(translate (vector 0 -1 0))
(let ((s (build-seg-plane 20 20)))
    (apply-transform s)
    (grab s)
    (deform-plane (pdata-size))
    (recalc-normals 1)
    (toon-light (pdata-size))
    (rotate (vector -90 0 0))
    (ungrab))
(pop)
```


oplethings and wobbl
0012.png"))
0093.png"))
094.png"))
titled-03
titled-04
titled-05
sm.png"))

Processing: *Programming for the Media Arts*

Casey Reas and Ben Fry

Processing is a programming language and environment built for the media arts communities. It is created to teach fundamentals of computer programming within the media arts context and to serve as a software sketchbook. It is used by students, artists, designers, architects and researchers for learning, prototyping, and production. This essay discusses the ideas underlying the software and presents its relationship to open source software and the idea of software literacy. Additionally, Processing is discussed in relation to education and online communities.

Processing

Keywords: Software, authoring tools, software literacy, education, online communities

Processing...
If you watch for it, you will notice this many times during the day. It displays after swiping a debit card at the grocery, gas station, or ATM and after taking a picture with a digital camera. Machines that process information are the digital heartbeats of 21st century society, pumping information from one location to another. Software is the medium that controls this flow of bits traversing the air and surface of our planet. Understanding software and its impact on culture is a basis for understanding and contributing to contemporary society. This essay focuses specifically on the relation between software and the visual arts through discussing Processing, a software language and environment originated by the authors. The concepts and social context for the software are emphasized, but we begin with a brief description of the software.

Processing relates concepts of software to principles of visual form, motion, and interaction. It integrates a programming language, development environment and teaching methodology into a unified system. Processing is created to teach fundamentals of computer programming within a visual context, to serve as a software sketchbook, and used as a production tool in specific contexts. It is used by students, artists, design professionals, and researchers for learning, prototyping and execution.

The Processing language is a text-based programming language specifically designed for generating and modifying images. These programs are written in a minimal text editor with adjacent buttons to run, stop, open, save and export programs. The following program draws two lines on the screen:

```
size(200, 200);
line(40, 180, 200, 70);
line(0, 60, 200, 160);
```

The numbers used in this program specify coordinates. The first row of code creates a window of 200 by 200 pixels. The second and third rows draw lines at specified locations in the window. Making the structure of the program slightly more complex enables motion and response to information outside the computer. The following program displays a similar two lines, but makes them controllable with the computer's mouse:

```
void setup() {
  size(200, 200);
}

void draw () {
  background(204);
  line(40, 180, 200, mouseY);
  line(0, mouseY, 200, 160);
}
```

Processing strives to achieve a balance between clarity and advanced features. Beginners can write their own programs after only a few minutes of instruction, but more advanced users can use libraries of increasingly complex functions when they are ready for a new challenge. Many computer graphics and interaction techniques can be discussed, including vector/raster drawing, image processing, color models, events, network communication, object-oriented programming, etc. Processing is easily extended to create sound, send/receive data in diverse formats, as well as export other 2D and 3D file formats.

Processing was created because we thought we could develop a better better tool for creating our research and art projects and could simultaneously develop a better environment for teaching concepts of software and interaction within design and art schools. Common personal experiences helped us to clarify our goals. We had both been using computers since childhood and had studied visual design for our undergraduate degrees. We both worked professionally creating software (Fry worked for Netscape and Reas worked as an interface design consultant for Microsoft, the New York Times, and J.P. Morgan). Most importantly, we were both studying with Professor John Maeda at the MIT Media Laboratory when the concept for the project was conceived. The culture of his Aesthetics and Computation group and our experience working on the Design by Numbers project were the greatest influence on Processing. This shared history is the foundation for our attitudes toward design, media arts, and technology.

Software

A group of beliefs about the software medium combine to set the conceptual foundation for Processing. Decisions related to designing the software and environment are made with these beliefs as a reference.

Software is a unique medium with unique qualities

Concepts and emotions may be expressed in this medium which are not possible to express in other media. Software requires its own terminology and discourse and should not be evaluated in relation to prior media such as film, photography and painting. History shows technologies such as oil paint, cameras and film have changed artistic practice and discourse, and while we do not claim new technologies improve art, we do feel they enable different forms of communication and expression. Software is unique among artistic mediums in its ability to produce dynamic form, process gestures, to produce behavior, simulate natural systems, and integrate various media including sound, image, and text.

Each programming language is a distinct material

As with every medium, different materials are appropriate for different tasks. When designing a chair, a designer decides to use steel, wood or other materials and makes this choice based on the context in which the chair will be used in relation to her personal ideas and tastes. This scenario transfers into writing software. The abstract animator and programmer Larry Cuba describes his experience, 'Each of my films has been made on a different system using a different programming language. A programming language gives you the power to express some ideas, while limiting your abilities to express others.' (Cuba p. 111)

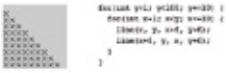
There are many languages available to select from and some are more appropriate to use than others depending on the goals of the software. Processing utilizes a common computer programming syntax which makes it easy for people to extend their knowledge gained through its use to many diverse programming languages.

Sketching is necessary for the development of ideas

It is necessary to sketch in a similar medium to the final medium and therefore to sketch electronic media, it is important to work with electronic materials. Painters often construct elaborate drawings and sketches before executing the final work. Architects traditionally work first in cardboard and wood to better understand their forms in space. Musicians work with a piano before scoring a more complex composition. This methodology is universal through the arts. Just as each programming language is a distinct material, some are better for sketching than others and artists working in software must also have environments for working through their ideas before executing final code. Processing was built to act as a software sketchbook, making it easy to explore and refine many different ideas within a short period of time.

Programming is not just for engineers

Many people think programming is only for people who are good at math and other technical disciplines. One reason programming remains within the boundaries of this type of personality is that similarly minded people usually create the programming languages. It is possible to create different kinds of programming languages that engage people with visual and spatial minds. Alternative languages such as Processing expand the programming space to people who think differently. An early

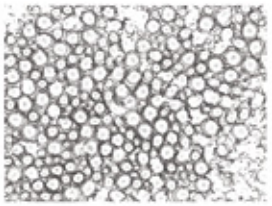


alternative language was LOGO, designed in the late 1960s by Seymour Papert as a language concept for children (Papert note). Through LOGO, children are able to program many different media including a robotic turtle and graphic images on screen. A more contemporary example is the Max programming environment developed by Miller Puckette in the 1980s. Max is unique because programs are created by connecting lines to boxes, representing the program flow and logic more like a flowchart than lines of text. It has generated enthusiasm from thousands of artists who use it as a base for creating audio and visual software. The same way graphical user interfaces (GUIs) opened up computing for millions of people, alternative programming environments will continue to enable new generations of artists and designers to work directly with software. We hope Processing will help many artists and designers to approach software and that it will stimulate interest in other programming environments build for the media arts.

Literacy

Processing does not present a radical departure from the current culture of programming, but re-positions it in a way which is accessible to people who are interested in programming, but may be intimidated or not interested in the type of programming that takes place in computer science departments. The computer, which originated as a tool for fast calculations, has slowly evolved into a medium for expression and Processing views computers from this perspective.

As early as 1974, Ted Nelson wrote about the minicomputers of the time in Computer Lib / Dream Machines, 'the more you know about computers ... the better your imagination can flow between the technicalities, can slide the parts together, can discern the shapes of what you would have these things do.' (Nelson p. 306) In this book he discusses potential futures for the computer as a media tool and clearly outlines ideas for hypertexts (linked text which set the foundation for the Internet) and hypergrams (interactive drawings). Other developments led to prototypes for today's personal computers at XEROX PARC in the mid 1970s. The Dynabook vision included more than hardware. A programming language was written to enable, for example, children to write storytelling and drawing programs and musicians to write composition programs. In this vision there was no distinction between a computer user and programmer.



Thirty years after these optimistic writings, we find ourselves in a different place. A technical and cultural revolution did occur through the introduction of the personal computer and the Internet, but people are overwhelmingly using the software tools created by professional programmers rather than making their own. This situation is described clearly by John Maeda in his book Creative Code, 'To use a tool on a computer, you need do little more than point and click; to create a tool, you must understand the arcane art of computer programming.' (Maeda p. 113) The negative aspects of this situation are the constraints imposed by software tools. As a result of being easy to use, they obscure some of the computer's potential. To fully explore the computer as an artistic material, it's important to make the 'arcane art or computer programming' into widely understood principles.

Processing strives to make it possible and advantageous for people within the visual arts to learn how to build their own tools – to become software literate. Alan Kay, a pioneer at Xerox PARC and Apple, explains what literacy means in relation to software:

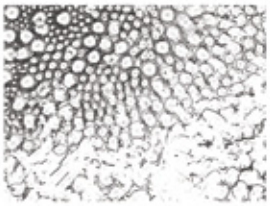
'The ability to 'read' a medium means you can access materials and tools created by others. The ability to 'write' in a medium means you can generate materials and tools for others. You must have both to be literate. In print writing, the tools you generate are rhetorical; they demonstrate and convince. In computer writing, the tools you generate are processes; they simulate and decide.' (Kay p. 191)

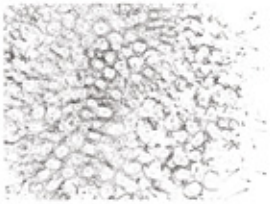
Making these processes which simulate and decide requires learning an artificial language, such as one of the programming languages which exist today or one which will be invented in the future.

Processing, the language we've been developing for the last three years, focuses on teaching the foundations of most existing artificial languages and focuses further on the elements of these languages which are advantageous to the visual arts. Processing is an excellent environment for beginners because there are immediate visual results, its complexity is scalable, there is focused online community support and it supports teaching a broad range of fundamentals. These software fundamentals include: variables, control structures, functions, pixel operations, procedural and object-oriented concepts, signal processing, 2D/3D graphics, vector and raster graphics, and transformations. Processing helps people with moderate skills to become more literate through its concise programming structures, familiar syntax, clear examples and additional libraries.

Open

While the Open Source software movement is having a major impact on our culture and economy through the development of initiatives such as Linux, it is having a minute influence on the culture surrounding software for the media arts. There are scattered small projects, but companies such as Adobe and Macromedia dominate software production and therefore control the future of software tools for use within the arts. As a group, artists and designers lack the technical skills to support independent software initiatives. Processing strives to apply the spirit of Open Source software innovation to the domain of the arts. We strive to provide an alternative to available commercial software and to raise

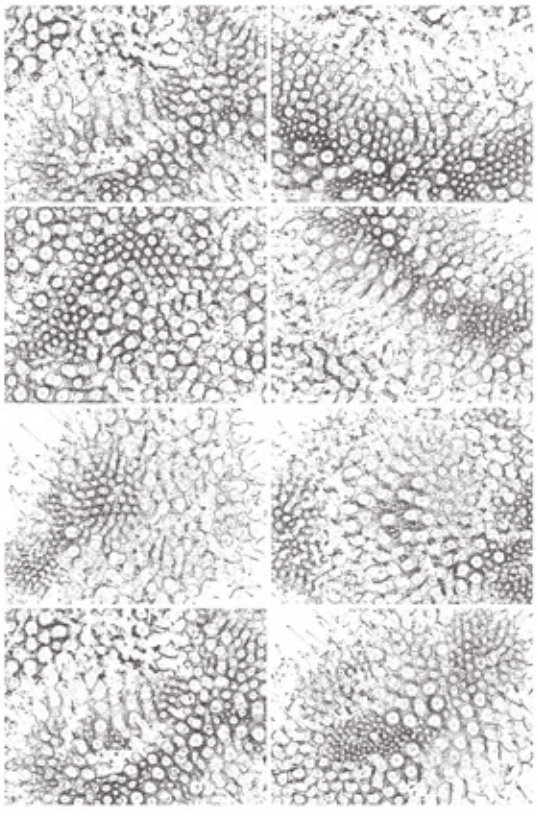




the awareness and skills of members of the arts community to stimulate interest in similar initiatives. Our goal is to make Processing easy to extend and adapt and to make it available to as many people as possible.

Processing probably would not exist without its ties to open source software. Using existing open source projects as guidance and for important components including the text editor and parser has allowed the project to develop within a relatively small amount of time and without a large team of programmers. Individuals are more open to donate their time to an open source project and therefore the software evolves without a budget. These factors enable the software to be distributed without cost, which enables access to people who cannot afford the high prices for commercial software. Opening the Processing source code allows people to learn from its construction and to learn through extending it with their own code.

People are encouraged to publish the code for their programs written in Processing. The same way the 'view source' function in web browsers encouraged the rapid expansion of the Web, access to other people's Processing code enables members of the community to learn from each other and the skills of community raise as a whole. An example involves writing software for a camera tracking objects in a live video image, thus allowing people to interact with the software through their bodies directly, rather than through a mouse or keyboard. The original code, written by Robert Hodgin, worked well but was limited to tracking only the brightest object in the frame (Figure 3). Karsten Schmidt (a.k.a. Toxi), a more experienced programmer used the code Robert posted on the web as a base for writing more general code which could track multiple colored objects at the same time. Using this improved tracking code as infrastructure enabled Laura Hernandez Andrade, a graduate student at UCLA to build Talking Colors, an interactive installation which superimposes emotive text about the colors people are wearing on top of their projected image (Figure 4). Sharing and improving code enables people to learn and to build projects that would be too complex without assistance.



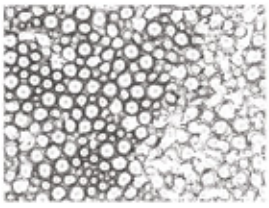
Education

Processing makes it possible to introduce concepts of software in the context of the media arts and also to open media art concepts to a more technical audience. The generality and origins of the Processing syntax make it a base for future learning. Skills learned through Processing enable people to learn other programming languages suitable for different contexts including web authoring, networking and communications, microcontrollers and computer graphics.

There are many established curricula for computer science (and thousands of variants), but by comparison there have been very few classes striving to integrate media arts knowledge with core concepts of computation. Using the classes initiated by John Maeda as a model, diverse hybrid courses are being created using Processing. Processing has proved useful for short workshops ranging from one day to a few weeks. Because the environment is so minimal, students are able to begin programming after only a few minutes of instruction. The Processing syntax, similar to other common languages, is already familiar to many people and this allows students with more experience to begin writing advanced syntax almost immediately.

In a one-week workshop at Hongik University in Seoul during summer 2003, the students were a mix of design and computer science majors and both groups worked toward synthesis. Some work was more visually sophisticated and some more technically advanced, but it was all evaluated within the same set of criteria. Students like Lee Soo-jeong entered the workshop without any previous programming experience and while she found the material challenging, was able to learn the basic principles and apply them to her vision (Figure 5). During critiques, her strong visual skills set an example for the students from more technical backgrounds. Students such as Kim Tai-kyung from the computer science department quickly understood how to use the Processing software, but was encouraged by the visuals in other students' work to increase his aesthetic sensibility. His work with kinetic typography is a good example of a synthesis between his technical skills and emerging design sensitivity (Figure 6).

Processing is used for teaching longer introductory classes for undergraduates and for topical graduate level courses. Within the United States alone, it has been used at small art schools, private colleges and public universities. At UCLA, for example, it is used to teach a foundation class in digital media to 2nd year undergraduates and has been introduced to the graduate students as a platform for topical explorations. In the undergraduate Introduction to Interactivity class, students read and discuss the topic of interaction and make many examples of interactive systems using the Processing language. Each week new topics such as kinetic art or the role of fantasy in video games are introduced, the students learn new programming skills, and they produce an example of work addressing



articulate © Casey Reas

the weekly topic. For one of their projects, the students read Sherry Turkle's 'Video Games and Computer Holding Power' and were given the assignment to write a short game or event exploring their personal desire for escape or transformation. Leon Hong created an elegant flying simulation where the player floats above a body of water and moved toward distant island (Figure 7). Muskan Srivastava wrote an eating game, where the objective was to consume an entire table of deserts within ten seconds (Figure 8). Teaching basic programming techniques while simultaneously introducing introductory theory of new media allows the students to directly explore their ideas and develop a deep understanding and intuition about interactivity and digital media.

In the graduate level Interactive Environments class at UCLA, Processing was used as a platform for experimentation with computer vision. Using existing sample code, each student had one week develop software which used the body as an input via images from a video camera. Zai Chang developed a provocative installation called White Noise where participants bodies are projected as a dense series of colored particles. The shadow of each person is displayed with a different color and when they overlap, the particles exchange, thus appearing to exchange substances and infect the other with their unique substance (Figure 9). Reading information from a camera is an extremely simple action within the Processing environment, which fosters quick and direct exploration within classes that might have previously required weeks of programming tutorials to lead up to similar projects.

Network

Processing takes advantage of the strengths of web-based communities and this has allowed the project to grow in unexpected ways. Thousands of students, educators and practitioners across five continents are involved in using the software. The project website serves as the communication hub, but contributors are found remotely in cities around the world. Typical Web applications such as bulletin boards host discussions between people in remote locations about features, bugs and related events.

Processing programs are simply exported to the Web, which supports networked collaboration and individuals sharing their work. Many talented practitioners and students have been rapidly learning and publishing their work, thus inspiring others. Websites such as Jared Tarbell's Complexification.net and Robert Hodgin's Flight404.com present explorations into form, motion, and interaction created in Processing. Tarbell creates images from known algorithms, such as Henon Phase diagrams and invents his own algorithms for the creation of images, such as his Substrate images reminiscent of urban patterns (Figure 10). On sharing his code from his website, he writes, 'Opening one's code is a beneficial practice for both the programmer and the community. I appreciate modifications and extensions of these algorithms.'(Tarbell) Hodgin is a self-trained programmer who is using Processing to explore the software medium. It has allowed him to move deeper into the topic of simulating natural forms and motion than he was able in the Flash environment, while still providing the ability to upload his software to the Internet. His highly trafficked website documents these explorations through displaying the running software as well as documentation in for form of text, images, and movies (Figure 11). Websites such as those developed by Jared and Robert are popular destinations for younger artists and designers and other interested individuals. By publishing their work on the web in this manner, they gain recognition within the community.

Many classes taught using Processing publish the complete curriculum on the Web and students publish their software assignments and source code for others to learn from. The websites for Daniel Shiffman's classes at New York University, for example, includes online tutorials and links to the students' work. The tutorials for his Procedural Painting course cover topics including modular programming, image processing, and 3D graphics by combining text with running software examples. Students maintain a web page containing all of their software and source code created for the class. These pages provide the professor with an easy way to review their performance and allows greater access to the other members of the class.

The Processing website is a place for people to discuss their projects and share advice. The Processing Discourse section of the website, an online bulletin board, has over two thousand members, with a subset actively commenting on each others work and helping others with technical questions. For example, a recent post focused on a problem with writing code for simulating springs. Over the course of a few days, messages were posted discussing

the details of Euler spring implementations vs. the Runge-Kutta method. While this may sound like an arcane discussion, the differences between using one method over another can cause a project to work well or to fail. This thread and many others like that are becoming concise Internet resources for students interested in detailed topics.

To date, the Internet reference for Processing has been translated into Chinese (traditional and simplified), Korean, Japanese, Indonesian, French, Spanish, Italian and Turkish. More should be completed by Summer 2005. Affiliated websites have been introduced in Japanese, Korean and Hebrew, to foster communities in other nations. These efforts extend the Processing network to thousands of people outside the English speaking populations.

Conclusion

The Processing approach to programming blends into established methods. The core language and additional libraries make use of Java, which also has elements identical to the C programming language. This heritage allows Processing to make use of over thirty years of programming language refinements and makes Processing understandable to many people who are already familiar with writing software.

Processing is unique in its emphasis and tactical decisions relating to its context within the media arts. Processing makes it easy to write software for drawing, animation and reacting to the environment. It is easily extended to integrate with additional media types including audio, video and electronics. Modified versions of Processing are under development by community members to enable programs to run on mobile phones and to program microcontrollers.

The network of people and schools using the software continues to grow and refined releases of the core software are in development. In the three years since the original idea for the software, it has evolved organically through presentations, workshops, classes, and discussions around the globe. We plan to continually improve the software and foster its growth, with the hope that one day the obscure practice of programming will reveal its potential as the foundation for a more dynamic media. ¶

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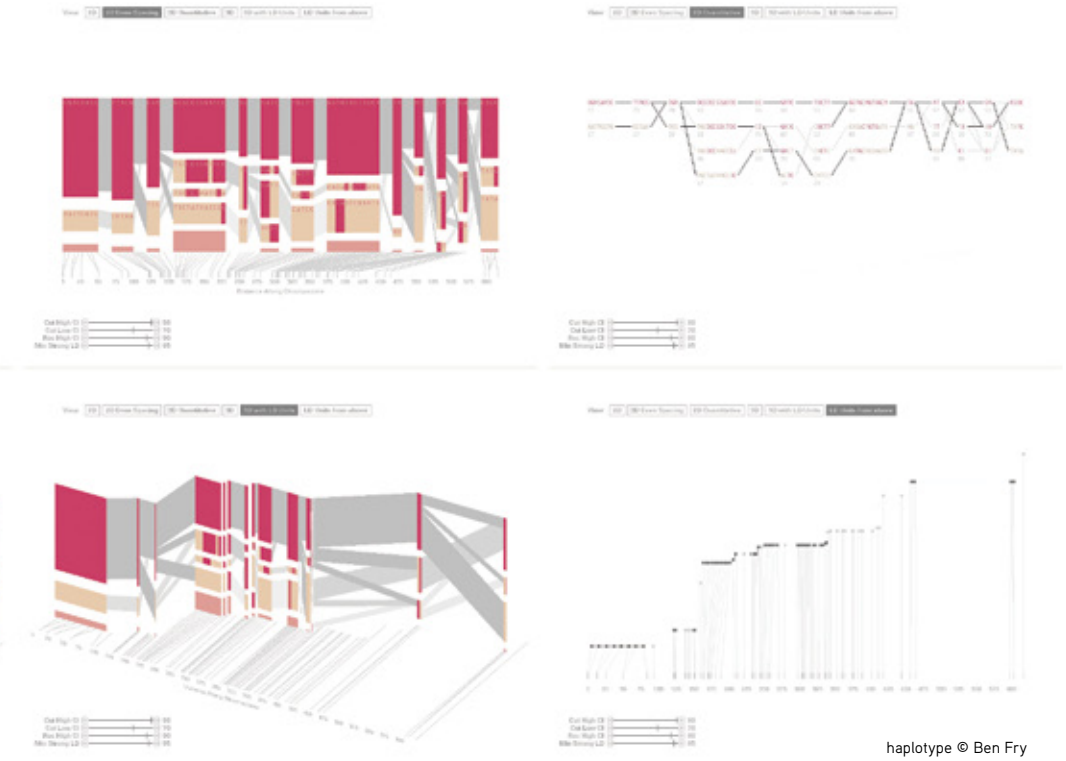
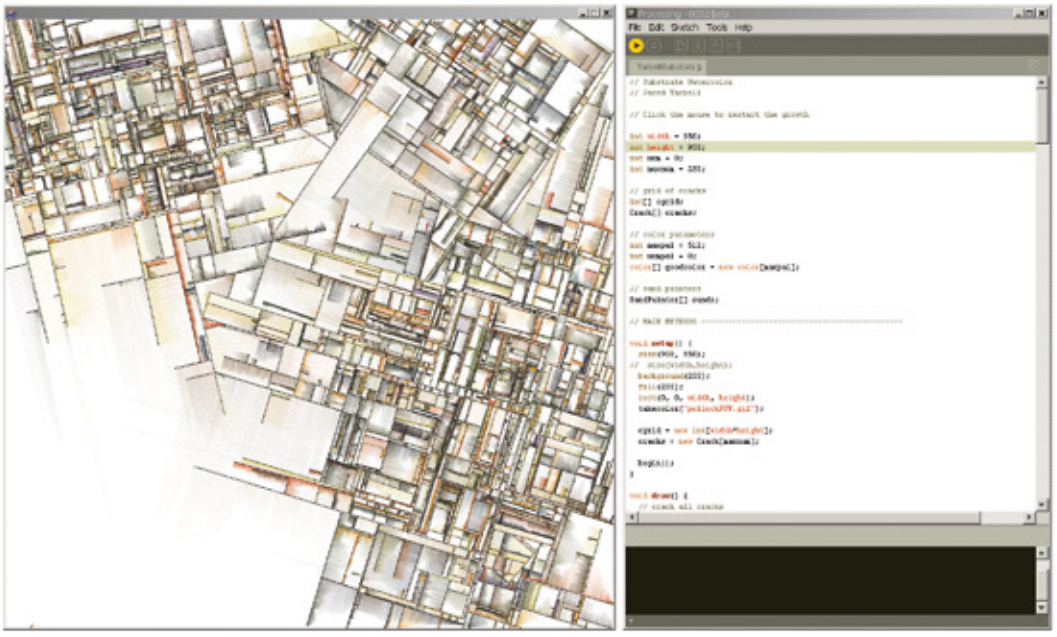
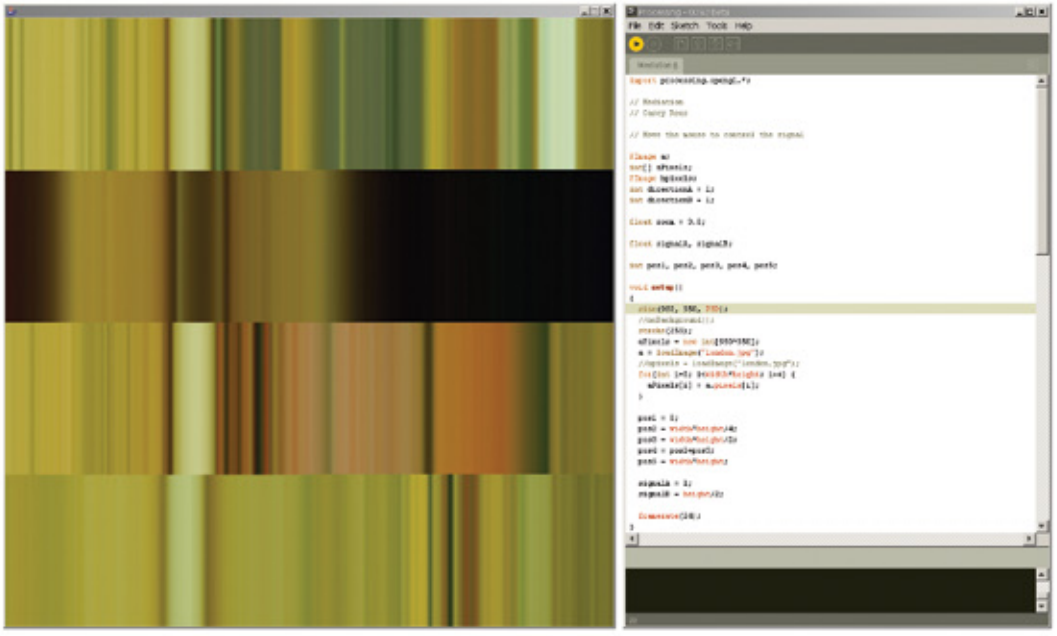
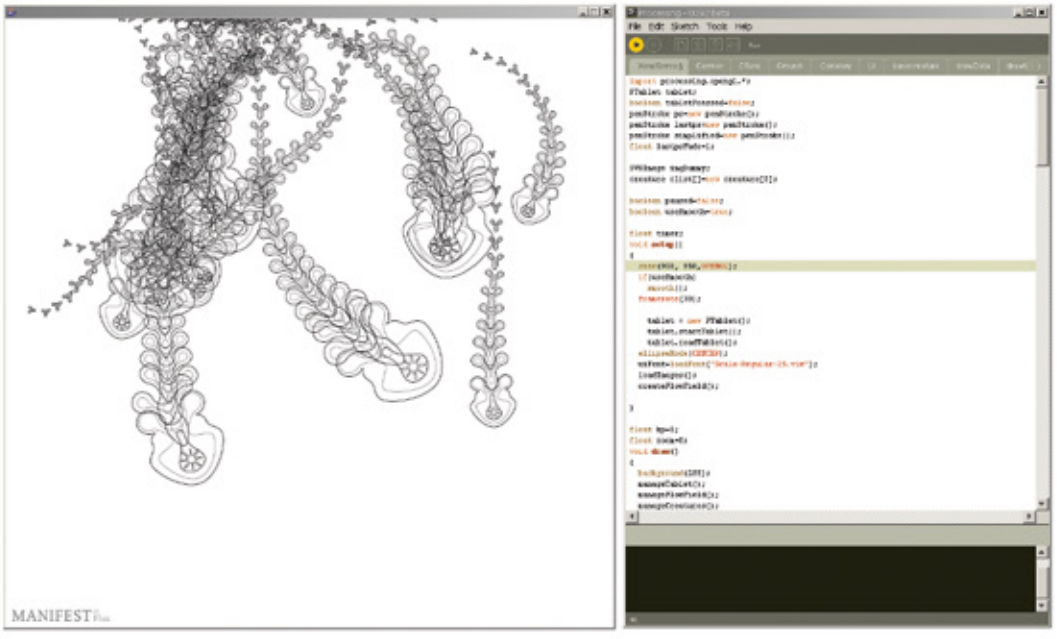


haplotype © Ben Fry



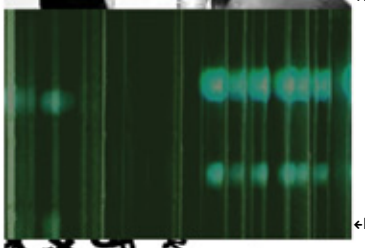




The Processing IDE

←Figure 3

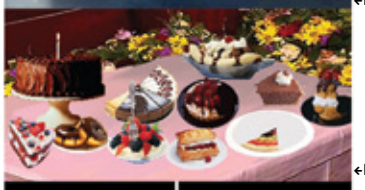
←Figure 4



←Figure 5

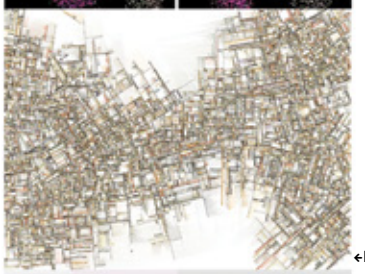
←Figure 6

←Figure 7

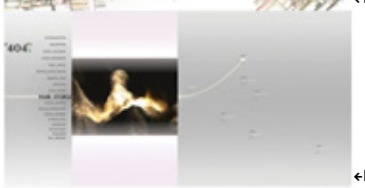


←Figure 8

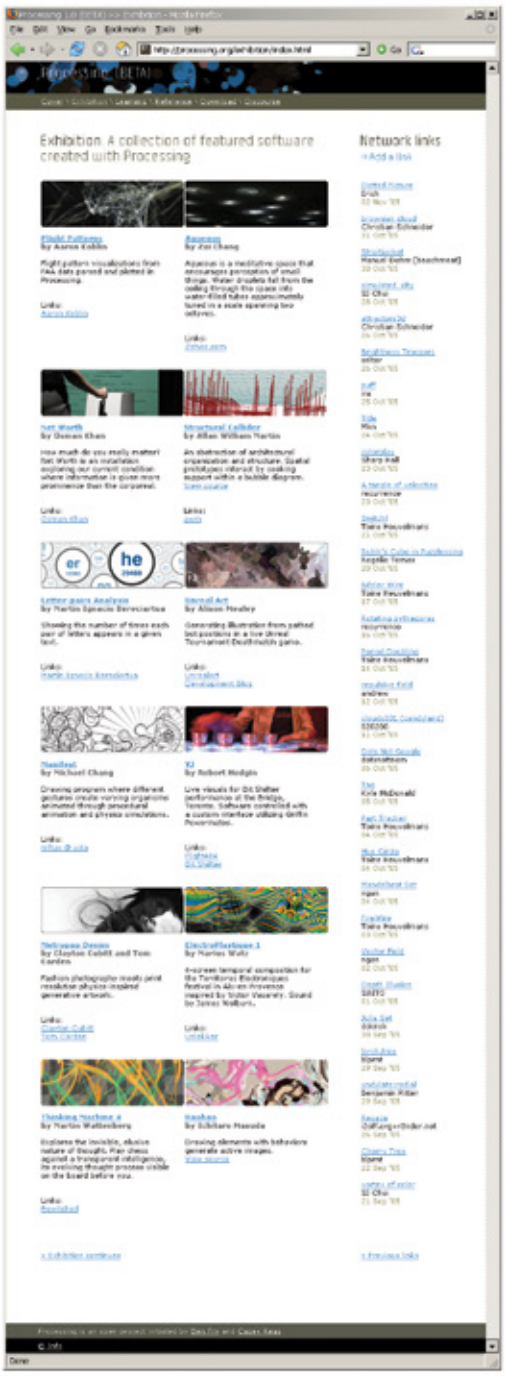
←Figure 9



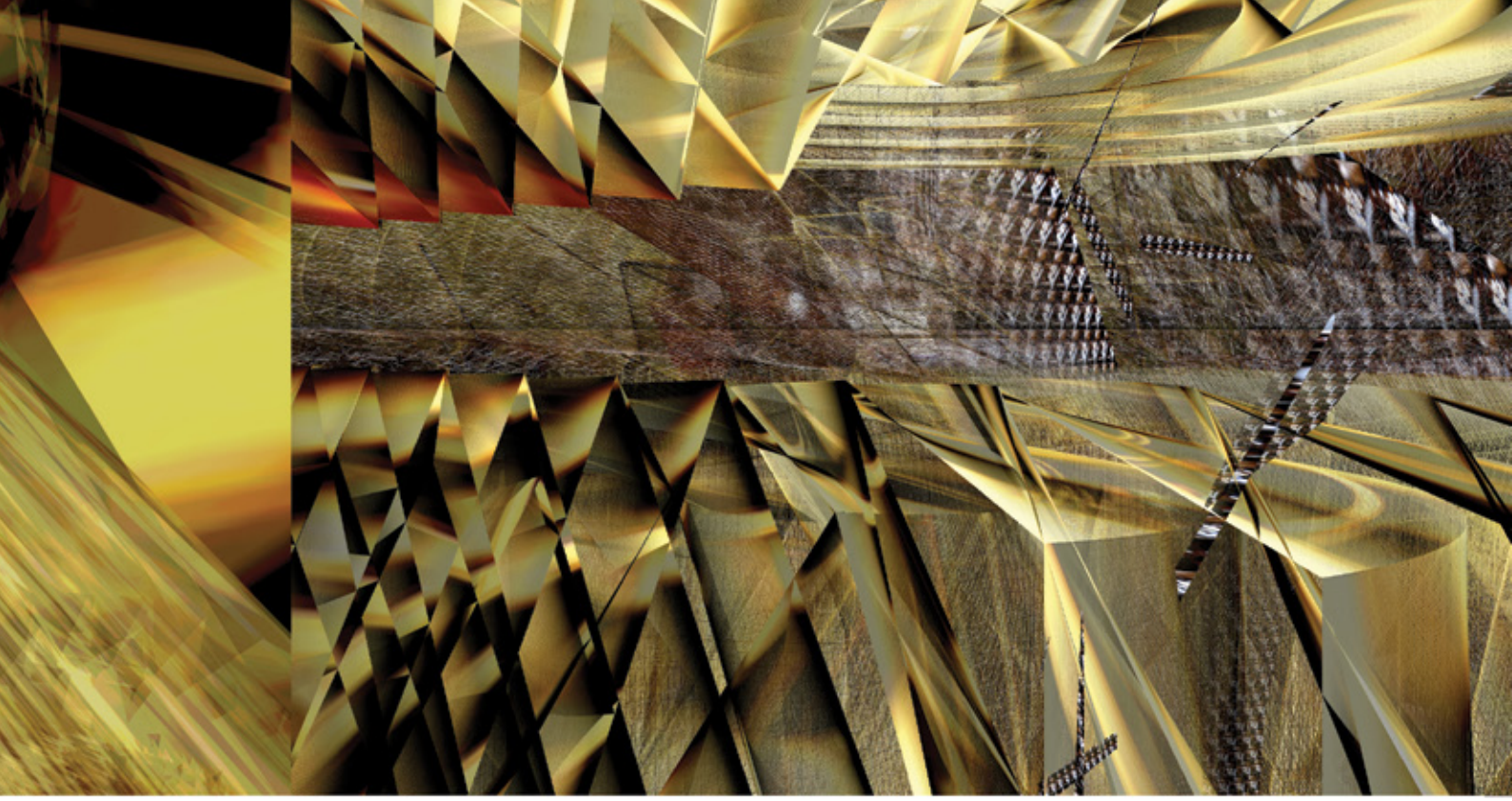
←Figure 10



←Figure 11



The Processing website



images ©jasch

Teaching Digital Tools for Live Audio-Visual Creation

Jasch

At the invitation of iMAL I had the opportunity to teach two workshops in Brussels in the spring of 2004 and again in the summer of 2005. I have been involved in performing, as well as teaching digital tools for audio and visual performance since 2000.

Around 1999 we saw the emergence of the first software tools for live processing of moving images, notably nato+_0.55 by the notorious Netochka Nezvanova. Without delving too much into the actual history of that net-art project and software system, I want to emphasize the impact of this and other new tools on the practice of live work with digital media. The appearance on the scene of a video tool using the same framework and syntax as the audio tools was a great revelation, and I remember spending entire nights excitedly exploring the visual sibling of my main music software, coming up with all sorts of interesting cross-over methods and mutations of musical into visual ideas.

From today's perspective this may seem a little naïve, but back then it had a strong influence and changed the way a lot of people perceived working with digital media.

Artists from such diverse backgrounds as improv music, electronic music, visual and graphic arts, installation arts and theatre converged around this new method of manipulating and generating visual as well as audio content in real time.

Some waypoints back in 2000/2001 were the 'nato-summit' at the Dutch Electronic Art Festival in Rotterdam, the workshop by Johnny Dekam and Brian Kane in Porto in June 2001, the fiftyfifty workshop at hangar in Barcelona in July 2001 by Johnny Dekam and myself, the betaville workshops in Paris in August 2001 and January 2002 by Pedro Soler and myself. The tag-team configuration of these events helped to bring together people from various backgrounds and focus not only on the techniques but also on bridging the gap between the sound and the image in the digital domain.

The Brussels workshops took all of that to another level. Six years down the road, the digital tool and the 'style' have become very familiar, the initial excitement about the new possibilities has blown over and people have started to dig down into the material and shape new expressions in more differentiated ways. In this context the need for a more specific focus and in-depth knowledge of the processes has grown.

closing event of the "Realtime 3D for Visual Expressions" workshop ©Yves Bernard

the distinction between exploration of digital tools or adding new expression to one's palette and truly diving into a new mindset and methodology for creation is an important one.

At iMAL the theme given was working with the powerful and complex layers that allow access to the three-dimensional graphic tools of today's machines. Starting on an intermediate level, the workshops dealt with working outside the traditional 'moving image' paradigm in a more structural and abstract manner. The scope of these encounters has been to deepen the understanding of the possibilities inherent in today's computers for artists and creators that do not have a computer science background.

The importance of dialogue, reflection and a long-term practise in these forms of media work is not to be underestimated. The distinction between exploration of digital tools or adding new expression to one's palette and truly diving into a new mindset and methodology for creation is an important one. I feel that only in the last few of years a real practice of these still young forms of expression has started to become visible and individual voices have started to emerge from the huge flood of sometimes gratuitous media content. I consider this a natural evolution and a healthy one. In a way the spread and democratization of the digital tools is raising the overall level of craftsmanship and thus builds a foundation for explorations not only on a technical plane, but also in finding an artistic and personal form of expression. To put it more succinctly: some individuals have mastered the tools and have reached a level of virtuosity that allows them to speak with a personal voice.

The exchange and transmission of these ideas in the workshops is a fundamental way to share, encourage and spread awareness. Considering the fact that most information about these tools and works is spread through the abstract channel of the internet, the meeting in real life of a group of people engaging in a face to face dialogue acquires a new meaning. Imagine sharing lunch at the 'walvis' restaurant with the people you have known only as names on a mailing list. The discussions and exchanges in these moments help to widen the perspective and deepen the insight for all parties present.

In these moments the focus shifts from the tools to the mindset, from techniques to visions, to expressing more of the human experience through the abstract digital instrument.¶

pushing and popping polygons for pleasure

Dave Griffiths

The realtime animation workshop was an important event for me as it represented an opportunity to demonstrate fluxus (a free software, script-driven realtime 3D engine) and at the same time discover the capabilities of this software in a wider context. User feedback and comments are the profit that drives you as a free software programmer, so this was a chance for me, as the main developer of fluxus, to get a great deal of that in one go. Prior to the workshop it also motivated a big drive to improve the software and concentrate on documentation, benefiting more people than just those who were able to attend the workshop.

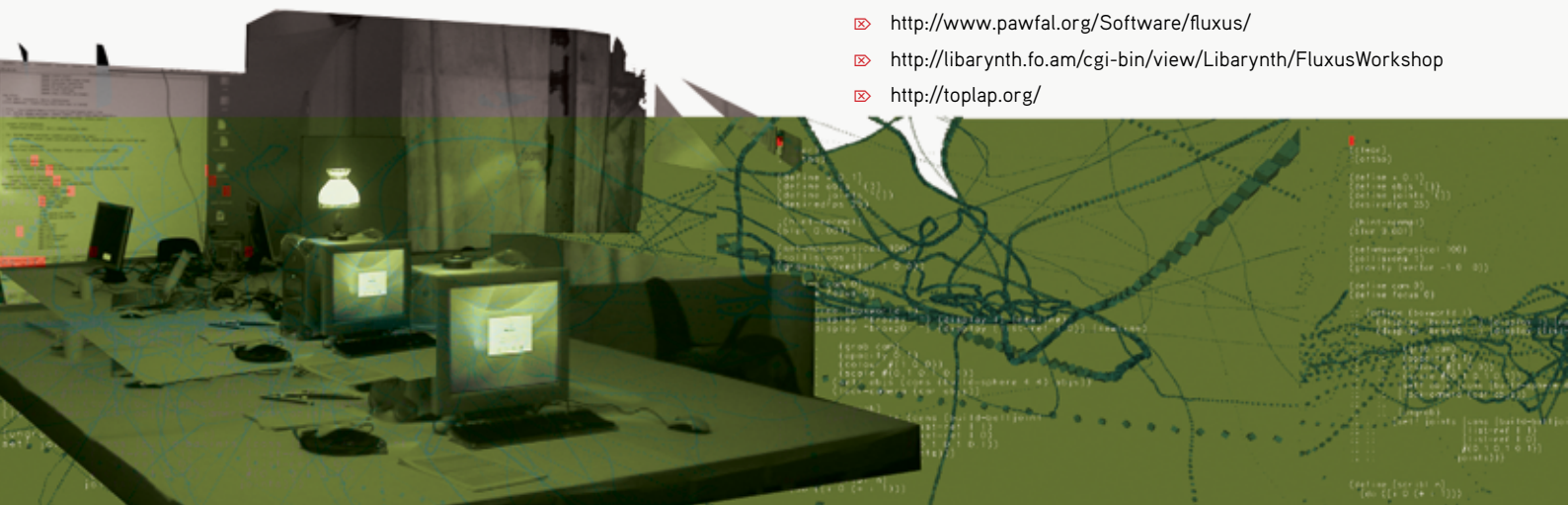
An animated world

One of the most important aspects of this workshop, and one that I wanted to explore prior to becoming consumed by the technicalities of computer graphics, was the long history of animation – particularly abstract animation – and its relation to music and technology. There is a rich history of abstract animation – both pre- and post-computer technology – stretching back a century, which has largely been ignored in the histories of both art and film. This background is important to be aware of, and also serves as a great inspiration for the realtime animator. The research I undertook for this workshop barely scratched the surface. It dealt with such key figures as Walter Ruttman, Oskar Fischinger, Mary Ellen Bute and John Whitney – pioneers who were without exception at the forefront of technology and expression in their time and whose work deserves more attention than it currently receives. Many of them had to invent and build the machinery on which to create their work, and had varied backgrounds in art, music and cinema, but felt that the future lay somewhere beyond all these areas – a concept which I feel is still applicable today.

After this introduction to the history of animation we briefly covered some aspects of the computer games scene – a field that is highly relevant in this context, as all the techniques and hardware we would later be using were initially driven by and created mainly for use of the games industry. I think it is important that artists explore these technologies and use them for purposes beyond which they were originally intended. It is this creative drive that seems now to be lacking in areas where it was once more prevalent, such as in games.

The games industry is struggling somewhat with its own image in a world of super developers, big budgets, movie licenses and ever more conservative publishing houses. However, the challenge to open games up to wider audiences via new input devices and game designs represents a great hope. For the moment they remain a great medium to hijack for subversive artistic purposes - mainly due to the constant demand from gamers for cheaper, faster, more featureful hardware. Games are also where the realtime aspect comes in – a sense of play and reacting to real-world events.

- http://www.pawfal.org/Software/fluxus/
- http://libarynth.fo.am/cgi-bin/view/Libarynth/FluxusWorkshop
- http://toplap.org/



I'm an artist! Why should I write code?!

The other aim I had throughout the workshop was to remove the myth of computer code as an "esoteric magic" understandable only to adepts, inaccessible (and undesirable) to an artist. Computer artists who are open to the prospect of writing code are able to gain an understanding of both the medium and the tool with which they work, and are less likely to be swept along by hype surrounding individual software products and their features. The idea that artists are simply "users" of computer software is relatively recent. It is an idea that I think is restrictive, and has possibly come about more for financial than creative reasons.

Incorporating the emerging practice of live coding to this dialogue – where computer code and algorithms are celebrated, being created live in front of an audience watching every keystroke unfold in front of them – seemed to particularly catch the group's imagination, whether they intended to go on to pursue programming or not. Live coding is partly a reaction to a lack of audience engagement in traditional laptop performance. The origins of live coding lie in computer music, but fluxus has its part to play as one of a small number of tools designed for graphical live coding. Live coding in fluxus also proved to be a useful method for teaching: rather than working through prewritten and lengthy example programs, a better approach was to write them in front of the participants who could then follow along on their own machines.

Live coding has always been at the heart of fluxus. Fluxus arose partly from this programmer's frustration at having to yet again figure out how to interface complex operations in terms of buttons, sliders and drop down menus – interface elements which are deeply ingrained in our software culture, yet seem unsuitable for many of the uses we put them to. Forcing them into every type of software has the benefit of making common metaphors for people to easily pick up new tools, but also makes obstacles for exploring better ways of working. Removing such interface elements in this case has resulted in a program that is easier to explain and use, and provides a more flexible performance instrument.

Programming is hard to teach well and very challenging to learn at first - but Scheme (the native script language of fluxus) is a good candidate for a newcomer to coding, and, being designed as a first language, it allows you to avoid learning lots of complex syntactic rules. People can pick up the way it works fast, but maybe we took too much for granted – it is hard to balance the teaching of basic programming practice whilst keeping it visual, relevant and dynamic. Because of this, some of the programming work was done on a one-to-one basis depending on the individual participant's desire to take the practice further.

As fluxus is free software, it is important for me to explain and promote the aims of the free software/open source movement as I see it, not so much in opposition to commercial software, but as a valid alternative with its own culture. It also represents an important political and social phenomenon which in recent years has been receiving attention from outside the software world.

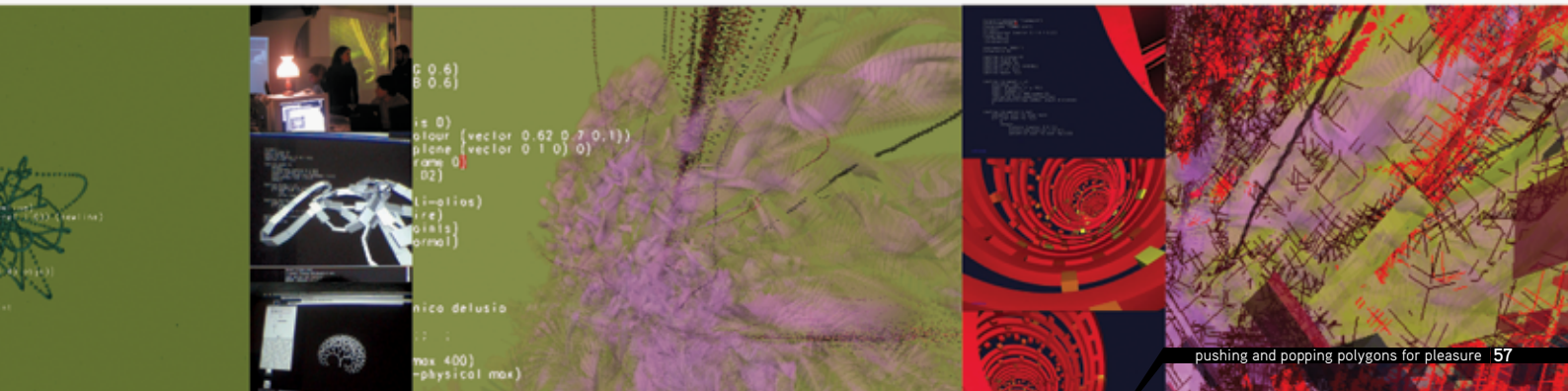
Accidental art

Despite tentatively daring to think prior to the workshop that we had a build of fluxus that was fairly stable, of course within a few hours of exposure to the group's probing experiments we had discovered bugs and inconsistencies of which I previously had no awareness! Although it was disappointing to see these problems arise, it's a great thing they were found because it gave me the chance to fix them. Some of the bugs looked quite good anyway – and therefore developed into something entirely intentional.

There was also quite naturally some difference between the participants' initial ideas and the capabilities of the software they were given to use. It was fascinating but somewhat alarming for me to see the group coping with the restrictions of a system which was initially frustrating for them. This conflict is where the creativity lies in any medium, eventually resulting in a more complete understanding of the problems, possibilities and advantages in the medium and allowing better work to follow. Novel concepts were often found that made perfect logical sense but I had never considered them, and now they could be tried with different levels of success. This sort of exploration is exciting for me – to see how people expect to work with this kind of software – and helps me figure out where to take the software in the future.

Despite this, it was not my primary concern that the participants should go on to use fluxus after the workshop, as it was never my intention for this to be a software training course. For me it was much more valuable that they could perhaps be exposed to different ways of working, and maybe gain some fresh ideas along the way. ¶

images generated during the soft-ware workshop at FoAM.



TOPLAP MANIFESTO (draft)

TOPLAP : (Temporary|Transnational|Terrestrial|Transdimensional) Organisation for the (Promotion|Proliferation|Permanence|Purity) of Live (Algorithm|Audio|Art|Artistic) Programming

http://www.toplap.org

TOPLAP is a collective of artists and musicians dedicated to the live manipulation of the running algorithm. Performances granted TOPLAP approval consist of improvised programming acts visible to an audience in the form of projected screens, showing the code as it is written. The group has drafted a manefesto which captures the spirit and ideals of the movement:

WE DEMAND:

- Give us access to the performer's mind, to the whole human instrument.
- Obscurantism is dangerous. Show us your screens.
- Programs are instruments that can change themselves
- The program is to be transcended - Artificial language is the way.
- Code should be seen as well as heard, underlying algorithms viewed as well as their visual outcome.
- Live coding is not about tools. Algorithms are thoughts. Chainsaws are tools. That's why algorithms are sometimes harder to notice than chainsaws.

WE RECOGNISE **continuums of interaction and profundity, but prefer:**

- Insight into algorithms
- The skillful extemporisation of algorithm as an expressive/impressive display of mental dexterity
- No backup (minidisc, DVD, safety net computer)

WE ACKNOWLEDGE **that:**

- It is not necessary for a lay audience to understand the code to appreciate it, much as it is not necessary to know how to play guitar in order to appreciate watching a guitar performance.
- Live coding may be accompanied by an impressive display of manual dexterity and the glorification of the typing interface.
- Performance involves continuums of interaction, covering perhaps the scope of controls with respect to the parameter space of the artwork, or gestural content, particularly directness of expressive detail. Whilst the traditional haptic rate timing deviations of expressivity in instrumental music are not approximated in code, why repeat the past? No doubt the writing of code and expression of thought will develop its own nuances and customs.

Performances and events closely meeting these manifesto conditions may apply for TOPLAP approval and seal.

http://www.toplap.org/index.php/ManifestoDraft

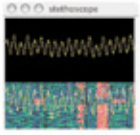
Interview with Akihiro Kubota

by so-on

[s-o] You define yourself as a digital materialist. Can you explain what you mean by this and what your artistic background is?

[AK] 'Digital materialism' is the fundamental concept for my audio-visual work: installations and performances. I see the digital computer not as a tool, but as a raw material for generating artworks, similar to stone, wood, iron and so on.
In a digital computer you have huge clusters of numbers, such as files and data. These numbers have no forms, and in order to perceptualize them we need to transform the numbers into sound, images, text, and so on. The important point is 'how to perceptualize' the numbers inside the computer, how we transform them into their perceptual form. That is the basic approach for creating art.

People often say it is very important how to digitize something, but I think the most important point is how to perceptualize the digital itself. The raw material is only numbers, without any form, and the way we transform these raw materials into a perceptual form is the basic approach of my digital work.



Do you mean by this that an artist should see from the start beyond the numbers a certain form of audio and visuals?

What is the starting point? The starting point is the numbers, not the physical world. Starting from the digital domain is the most important approach for the digital materialist. These numbers are some kind of conceptual material and then they transform into a concrete form.

You are part of the organization 'the society of algorithm'. Their core artistic business is to work with algorithms. Can you explain in a clear way what an 'artistic algorithm' is?

An application or a program is made out of algorithms and a structure of data. The algorithm is the abstraction of the process, while the data stands for the abstraction of objects.

In general an algorithm is a very fundamental mechanic of the universe. Algorithms exist everywhere: in my body, in my cells, in my DNA, and in physical materials such as earth and air... in the artistic way we think how to externalize, how to process this algorithm to make an artistic work, with audio or visuals or text.

Is it right to say that in one way algorithms exist, but in another way algorithms can also be created from scratch in a computer?

The important point of the digits in the computer, the raw material, is the abstraction. Of course algorithms are everywhere, but the essence of algorithms is to externalize, to abstract something. So we can say that the computer has data and algorithms, and that is the programming. The data is related to the digital materialism, it abstracts the various materials or the various forms of audio and video or text under numbers.

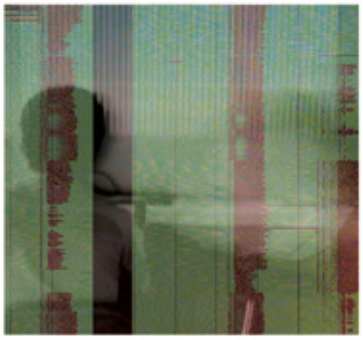
In the way the algorithm abstracts the process, it can be seen as the equivalent of human skills as playing the piano or drawing sketches. The algorithms are the skills of the computer to generate audio and visuals and text.

So, the algorithms can be seen as a recipe to create audio or visual material?

Yes, that's right. The digital data can abstract the audio and the visuals. Also, code can abstract the process of making audio and visuals. That means the exchanging of the process of audio and visuals or the unifying of such processes under the code.

What is the history of algorithms in the arts context? some examples? Is THE HUB a good example for the algorithmic use of audio? Or the Vasulkas for video?

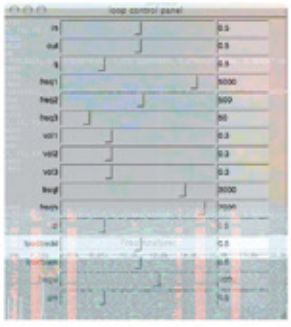
I think there are four levels of algorithmic art.
The first level is physical, like the early constructivist drawings of the 1920s, or like Mondriaan.



The second level is analogue algorithmic art, like electronic art from the 1950s – for example light synthesizers and kinetic art or op art, are all based on simple algorithms.
The third level is the digital algorithmic art, early computer art of the 1960s and 1970s. It is the beginning of programming and coding for audiovisual art.
And now we are in the fourth level of algorithmic art: networked or connected algorithmic art. Today we are sharing code and algorithms, using the network, so there is a connected environment for the algorithms.

So the first three levels are merely based on an individual approach of algorithmic art, while this fourth level is about collectivity and connectedness? Sharing code and information in real time. In what way does this new approach change the conception, production and presentation of an artwork for you? Distributed artworks, are they more difficult to agree on? Does a collaborative setup differ from an individual setup when artists work with algorithmic art?

There are two aspects of algorithmic art. The non-real-time algorithmic art: here you have first the coding and then the rendering into sound or images, to perceptualization of the algorithmic composition.
Another aspect of algorithmic art is the real-time aspect. Real-time algorithmic art is writing code and generating audio and video simultaneously: here you can speak of an algorithmic improvisation.



In a networked environment we also have three ways of audio visual abstraction: parametric abstraction, spectral abstraction, and material abstraction.
And in such an environment, algorithms are connected, distributed, open, organic, evolutional, and social. Here we speak about the 'society of algorithm'.

When you work in a networked environment, how do you work out your concept? When you work online in a distributed way, you still can use a chat to discuss the approach but once the performance starts, you have to agree and follow and perform together in a network where everyone has the same importance. Is this way of working always that simple, or do new ways of presenting and producing emerge out of it? In what way does a virtual [online/real-time] collaboration differ from onsite networked collaboration?

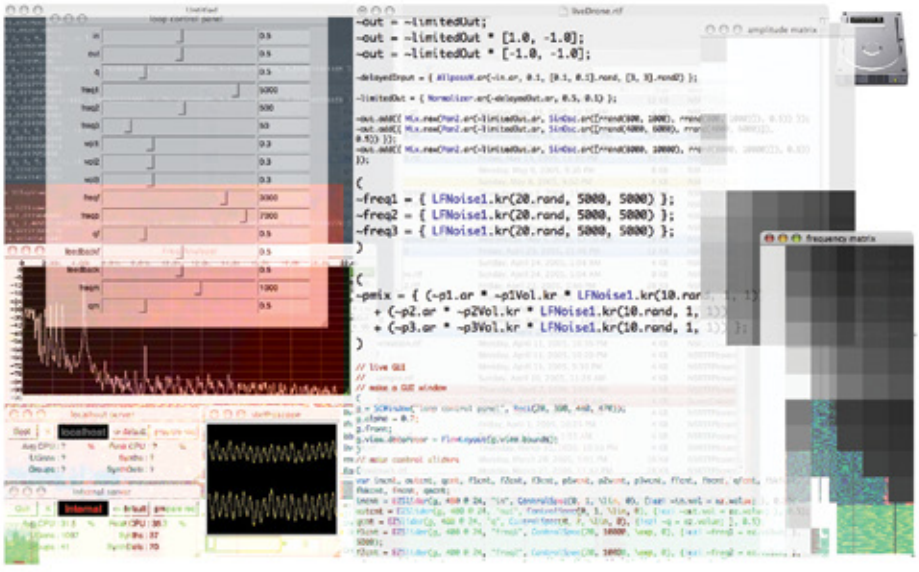
Onsite we can communicate in many ways, with body language, speech, writing etc.... but the online collaboration has to figure out how we can abstract our communication. This is a very important issue for digital art, because abstraction is the key issue for algorithmic art. So, if we engage in online collaboration we must abstract our way of communicating. We have to find out what is the essence of the communication, what we really think. We have to innovate our communication .

Human perception, cognition, memory and thinking are emergent, generative. It's also redundant and improvisational. In an onsite situation, this is closed, rigid, inextensible and centralized. In an online situation, this is open, flexible, extensible and distributed. We can see the desktop as a virtual body. And connected desktops as connected bodies.

Does this mean that when you're working online you have to know the people with whom you are working together, or can they also be strangers? Is it important to be familiar with the work of the collaborating artists?

If we can open and share the protocol of the communication, we can collaborate everywhere. There are different levels of communication. Sometimes you can discuss things very intimately with a friend, but sometimes we need to open up the discussion, for example through an open chatting space on the network. So this kind of closed collaboration can generate something. Also, open collaboration can generate something different, so we can choose both ways for creation from the moment we can abstract the protocol of the communication.

Do you take into account the place of the listener, of the public, during the creation of a collaborative artwork? Are you aware of a different way of perception of the artwork by an online [and sometimes onsite] public?



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An onsite audience needs dense communication between the artist and the public, but an online audience can be happy with more ambient communication. The people can choose themselves in what way they listen to the performance, in what way they share the physical space...
A networked performance is based on sparser communication. But it's interesting to me. Sometimes I just go away during online connected performances, I go for a coffee or so. These possibilities inspire another way of performing, another way of presenting and also another way of perception by the public.

Ok, online you work in a rather open setup. There is no fixed stage, no fixed location. Can everybody collaborate when you set up an online connected performance? Or do you have agreements with certain artists upfront?

Mainly I think we set up something fixed with people we know, because to share a good artwork with performers and with the audience, we need some basic fundamentals.
So we need to collaborate with a fixed group of artists who can offer this basis, and then other artists can jump in and do some 'topping' of the artwork.
Every performer is not equivalent. There are different levels, but they are all connected.

If time and space don't count anymore in these online setups, and artists from all over the world collaborate in real time, does this have important implications for the nature of the collaborative artwork? I mean, do you feel the mix of different cultures in one work and do they influence the conceptualization and creation of the work in a radically new way?

Time and space are exchangeable in an online collaboration, from this emerges a sense of distributed synchronicity.
It's a simple and clear way to synchronize on different levels if you're working with applications such as supercollider or max/msp or pd, and if you can share the code. Culture and place are not important anymore in the creation, and different levels, such as academic or artistic approaches, are mixed.
Also in the use of code, you have different approaches. You can write code from scratch, this is the very traditional way of working with code, but now we don't need to do this anymore. Today you can sample parts of code on which you continue, more the way of working as a DJ, a code jockey, and in this you can feel and see different cultures, in the different parts of code, from different backgrounds, all put together.

What exactly is 'live coding', from an artistic point of view?

Live coding is real-time, improvisational, connected, transcultural audio-visual art of the 21st century, of the post-DJ, post-GUI era.
A code jockey samples, edits and plays code like a disc jockey. He's an algorithmic improviser.
A networked code jockey, on top of that, is a connected, collaborative algorithmic improviser of the post-DJ era.

When you're working with live coding and you sample pieces of code from different applications, are they all immediately compatible? You have to link them...

Yes, that's why we need to abstract the communication. Code is modulated, so if we define how to communicate the code, we can exchange modules, add parts of code, and that's the communication between algorithms.
That's the basic meaning of the society of algorithm. The language can abstract our communication and also abstract the communication of the code. So the code and the human become part of mixed networks, and we can generate new approaches for creating code in real time. Of course it's difficult to do this in real time, but if we define the communication protocol, a common format between code and human, then we can match and redesign in real time.

Can you give me an example of the way you mix visual programming [like max msp, for instance] with code that is written in the command line? how does it work, live coding?

I prepare many small upfront modules before the performance. All modules have the same protocol, the same input and output. For example I prepare templates for how to control the modules, especially for the performances.
In real time I can modify these modules and connect them to other modules.
With for example supercollider I work with another approach. I don't mix both applications. So I prepare some code before the performance, you can compare it to a kind of skill that I have in my muscles. Imagine you play the piano, you practice it everyday, you work on it, and then it gets into you body.
The same for code. I practise every day and I also have an archive of my favourite code, as you can have an archive of your favourite sounds...
An important aspect of code is that it's easy to change. Easily modifiable format, this is one of the 'code features' of the open source programmers.
Mixing or scratching with code in real time changes the sound more dynamically, so that's one of the benefits of live coding. We can easily change sounds and images.

For me this approach goes beyond the domain of a DJ. A DJ works with samples from someone else, but you modify the samples of code, so you create a new work with it?

Yes, by adapting the code we can extend the performance to a higher level than just sampling. We generate sounds more dynamically. We select pieces of code upfront, then during the performances we write new patches and new algorithms with it. The important point is that in onsite collaboration, artists often need very rapid responses, but online you can cope with time in a different way, it's another kind of collaboration.
We can change code during the performance in a chat or BBS, or we can do distributed coding using the same environment.

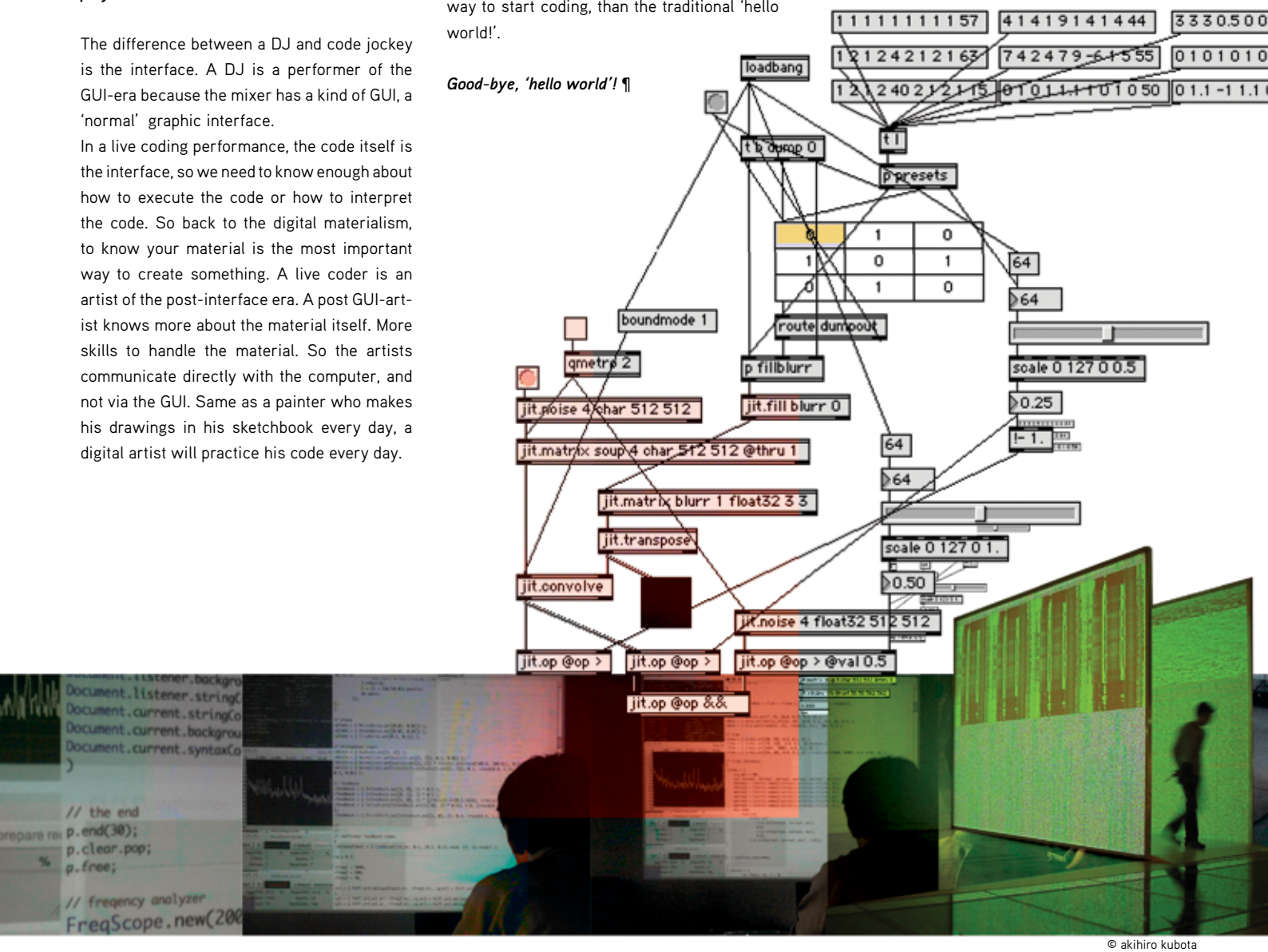
Do you need to be an experienced coder or programmer to participate in these performances?

The difference between a DJ and code jockey is the interface. A DJ is a performer of the GUI-era because the mixer has a kind of GUI, a 'normal' graphic interface.
In a live coding performance, the code itself is the interface, so we need to know enough about how to execute the code or how to interpret the code. So back to the digital materialism, to know your material is the most important way to create something. A live coder is an artist of the post-interface era. A post GUI-artist knows more about the material itself. More skills to handle the material. So the artists communicate directly with the computer, and not via the GUI. Same as a painter who makes his drawings in his sketchbook every day, a digital artist will practice his code every day.

Are you sometimes inspired by real life events? Say, for example when you're walking through a city, can the city inspire you?

Yes! Compare it to Messiaen who was working with the sounds of birds and transcribed their singing into notation and made a score out of it. For me it's the same as for a traditional artist: how to translate the city sounds into a notation for music. Noise, sounds, translating them into code: it's the same process.
Another important source of social inspiration is the network: the mailing lists of communities where you can find some pieces of code or some new ways described for writing code... this is also a part of the city for me. A virtual city or community. This is very important. Education in coding always starts with the academic 'hello world'! But I give my students some example patches that they can change freely. The importance is that they understand how to work. How to generate lines of code, how to move a line or deform a rectangle is more important in the beginning, and a better way to start coding, than the traditional 'hello world!'.

Good-bye, 'hello world'! ¶



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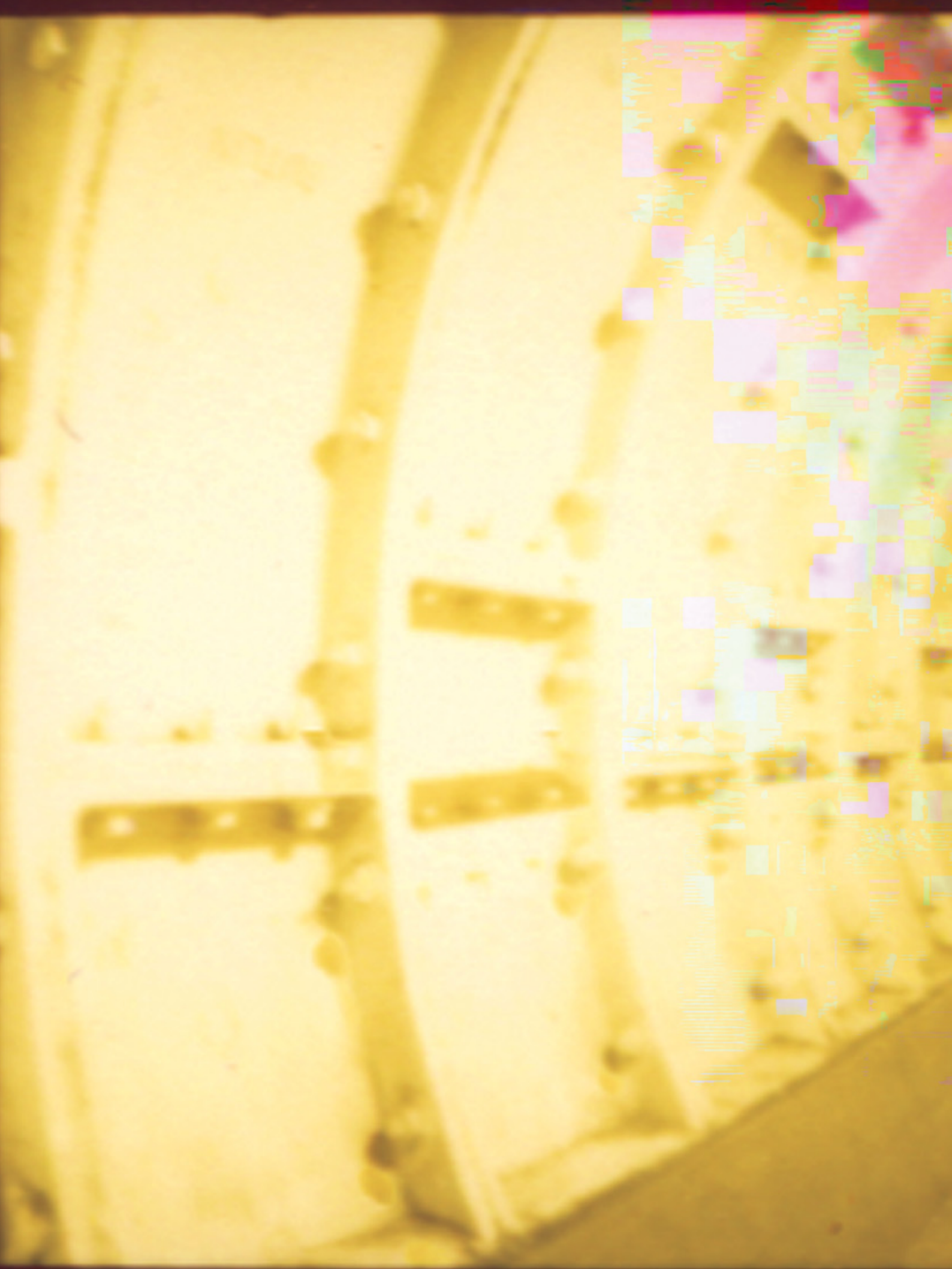


Interview With David Rokeby

by Xavier Ess

Xavier Ess: [00:00:00]
David, can you explain to us what softVNS is, this software that you developed ?

David Rokeby: [00:00:08]
softVNS is a toolbox that I use to process video in real time to create interactive installations and to create video installations. It's very fast and allows you to manipulate video as if it were used as clay or paint for something, very fluid and easy to use. [00:00:31]

XE: [00:00:31]
The main feature in the softVNS software seems to be the analysis of movement and the fact that one can play with movement in the image?

DR: [00:00:41]
Since about 1981, I've been working with video as a way of tracking movements, of understanding movements, of looking into the world and having the computer understand something of the world. softVNS 2 includes in a large part tools to find people's heads, to find certain colours, to see the quality of certain movements, to play virtual switches or triggers in space, things like that. [00:01:08]

XE: [00:01:08]
For more than twenty years, your work has been about the interaction between humans, the human body and machines. What interests you in this? Is there a man-machine communication?

DR: [00:01:26]
There are two kinds of interaction that are going on when you have humans and machines in interaction. One is the interactions between the humans and the machines. The second is the interactions between humans and humans through the machines. I find both very interesting. But I say, in some ways, the one that I found most interesting is the humans responding to their own reflections, their own shadows through the interactive system... Often because we don't recognize ourselves completely. We may adopt very strange relationships to our interactive shadows, we may mistake our intelligence for the system's intelligence, for example. I found this relationship very interesting because I think it's important that we start to understand what the nature of our relationships with these machines is, both its positive aspects and perhaps its not so positive aspects.

XE: [00:02:18]
Does that mean that a very simple machine can fake a human being, which is something very complex?

DR: [00:02:30]
Oui, oh sorry, yes,... That is because the human is always more complicated than the machine. We are much more complicated than any computer and so when you create an interactive feedback loop, the complexity of the human being fills the whole system. Some of it comes back to you as part of the response of the system. Especially because we do not know ourselves so well. We are not so aware of how our body is moving. We think we are but we are not. So the result in a system like my Very Nervous System which translates body movements into music is often surprising because we don't realize how we've moved. So we are surprised with the results, not because the results are very unusual but because our movements were different from what we thought.

XE: [00:03:18]

In your work, there is also this aspect where technology highlights human feelings, as for instance in 'Watch'. In this work there are people who do not move, the homeless. Can you talk about it?

DR: [00:03:39]

'Watch' had a very interesting birth. I had set up a situation where for the first time I could see what my computer was seeing. The computer was mostly seeing movements. I was tired of jumping around in front of my camera to generate movements for it, so I pointed the camera out of the window, onto the street. I lived on a very busy street at that time. I had two processes going: one that showed the movements in the image (in this busy street, all the cars, all the people walking by, etc...). On the other side, it was showing only the stills: so the buildings were visible but cars, people walking by were invisible. On the street, there happened to be many homeless people and homeless people tend to stay there on the corner and maybe hold their hands out for some money. They were the only people who were still. So on that side of the image, you see all the people who are very busy, important, and shopping and going to work are invisible, and the people who are doing nothing are visible. This was particularly interesting to me because when you live on a street with many homeless people, you create your own filters and you do not see those people any more. I was interested in the way a simple technology could turn these filters that we develop inside out and upside down.

XE: [00:04:59]

You've made many works using video surveillance. This has become political. Up to now, interactivity in art was just something funny as, for instance, in these works where people enjoy playing with an interactive work to create music with their bodies. But here, these recent works are not at all funny any more?

DR: [00:05:31]

Yes, that's true. I think part of my experience of showing Very Nervous System - which is very exciting, fun - is that there are lot of ideas and experiences that happen in VNS that are really interesting but maybe not so much fun. The fun of VNS sometimes hides the other things which are very interesting. So in a way I try to make my work a little more boring. It sounds funny, but making it a little more boring helps you think a little bit more about the questions that are being raised. The reason we need to ask these questions is because the technology of interactivity, of computation, of virtual reality, all these technologies are becoming more and more part of our everyday life, part of our communication with each other. I think this is in many ways a tremendous addition to our culture but in some ways it's not necessarily such a good thing. We need in a way to ask some questions as we adopt the technology to make sure we bring the technology into our life in the best way, and not in way that is just the easiest. So more recent pieces are perhaps more difficult because I feel it is more necessary in the face of war on terrorism with a lot of mechanical surveillance, 'automatic detection' of terrorists for example, that the technology can no longer be so innocent. So as an artist I must reflect that.

XE: [00:06:58]

Is it the real intention of this work, 'Sorting Daemon'? Is it really inspired by September 11?

DR: [00:07:04]

Oui, oui... Yes. It was actually very hard to make that piece because I was making it during the build-up to the war in Iraq in the spring this year. It was hard to stay focused on an artwork. You think of an artwork that I would show in a gallery, and a small number of people would see it when a very large thing was taking place around the world. It was very distracting but I was glad finally to be able to bring the piece together in the end. Also it was interesting, I think. Opinions are split on that piece: some people find it terrifying because of the way it separates people from their clothes, and sorts them according to head sizes and skin colours. And some people just find it very beautiful and don't find it scary at all. It was interesting to me to ask the question : was I there for effectively asking the critical question or was the technology so interesting that it distracted from the political questions? And that's the kind of question I like to keep asking myself to keep becoming a better artist because there are always things to learn, especially working in new media where the rules aren't set.

stills from video (camera Richard Wandel, RTBF)

XE: [00:08:14]
Maybe you should explain to us how 'Sorting Daemon' works?

DR: [00:08:20]
'Sorting Daemon' is set up in a gallery with a very long window looking out on the street. It's an interesting street because you have business people - it's part of the business district; there are also a lot of theatres, and also crack dealers on the corners, that's quite a mixture of different cultures. There is a camera that can pan and tilt and zoom and it's looking through the window. It's looking for people. A person is simply something that is moving, that is tall and wide (contrary to cars, which are wider than tall). When it finds a person, it looks for the flesh colours. When it finds that, it removes that, separates the face, and then it looks for the other colours. So maybe the colour of your shirt and the colour of your pants. And it sorts those on a separate screen where you see a whole array of faces on one side which are being sorted according to these very simple rules, and on the other side, you see bits of jeans, and bits of coats and ties and jackets, all these colours separated and sorted into the range of the rainbow. In some ways, it looks like a painting, an oil painting, very thick density layers, but this act of taking human body and pulling it apart, a very active analysis which is always taking part of things and sorting in... taking people away from their life in the street and sorting them into this arbitrary mathematical space... there is a kind of beauty but also a kind of violence there. In the end that was what I was after, with that mixture of darkness and the dark attraction of that beauty in the context of the war and the questions that are raised about privacy and freedom.

XE: [00:10:10]
In the title 'Sorting Daemon', does the daemon sort human beings, or can one consider each human as a potential daemon according to some power?

DR: [00:10:23]
The term 'daemon' in this case and the term 'Sorting Daemon' in fact is a term invented by Quick Maxwell, who was a physicist a couple of centuries ago who was thinking about a little creature, a mythical creature (he didn't believe it existed, but he proposed it for a thought experiment), who would choose molecules that were cold and send them this way, and molecules that were warm and send them that way. So, it's sorting hot and cold molecules. To me this is like the border guard who says these people are allowed to come in this country and those people are not. And when you consider that now automatic cameras are being installed at the US border automatically to detect people who should be questioned and separated as potential terrorists, to me this is a sinister sorting daemon.

XE:
Is it true what you are saying?

DR: [00:11:14]
It's true. Whether it works very well is another question but it's certainly something that they are trying to do. If you look on the website of the American Defense Department, you can find the projects that they are working on called the 'Human ID', which is human identification at a distance. The whole idea is to be able to identify by camera at great distance who a person is so that you can either protect yourself from them or capture them without any warning.

XE: [00:11:44]
Could you tell us something about your work 'n-chant', a work made up of a group of intelligent machines? While watching your video documentary, I don't know if I was afraid or fascinated while they were all singing together... Can you explain to us the concept and how it works?

DR: [00:12:10]
In 'n-chant' there are seven computers, each of which is capable of wandering through its memory, going from idea to idea, perhaps to the idea of car, to the idea of driving, to the idea of the road, to the idea of travel, to the idea of homesickness, etc, etc,... And with the stream of ideas, the stream of 'consciousness' - I am using quotation marks because I don't mean it quite literally - it expresses this in proper English sentences and little English fragments. So it's like it is daydreaming, imagining and saying what it is thinking about as it wanders through its memory.
But each of the computers is connected to the others and they tell each other what is interesting to themselves, so they encourage one another to start thinking about the same things. After maybe a few minutes you hear that what this computer is saying, what this other one is saying, the one in the back becomes similar.



One is talking about food, another one about being hungry, a chicken, a roasted chicken, and they slowly get together, until suddenly they say the same words, approximately the same way, and it sounds very much as if you are in a church and people are praying or something. However, each computer is also using voice recognition. If you walk up and talk to another computer, it tries to understand what you are saying and then it stimulates itself, it takes this new information and this creates a new set of interests for the computer and it starts talking about these new interests. And that computer becomes a dissident, you might say, in the community. This new information spreads from computer to computer and the chant - speaking together - falls apart into a chaos of different voices. And then slowly if you leave it alone they will come back together.

XE: [00:14:05]
So the community always wins? The unique, the individual cannot exist?

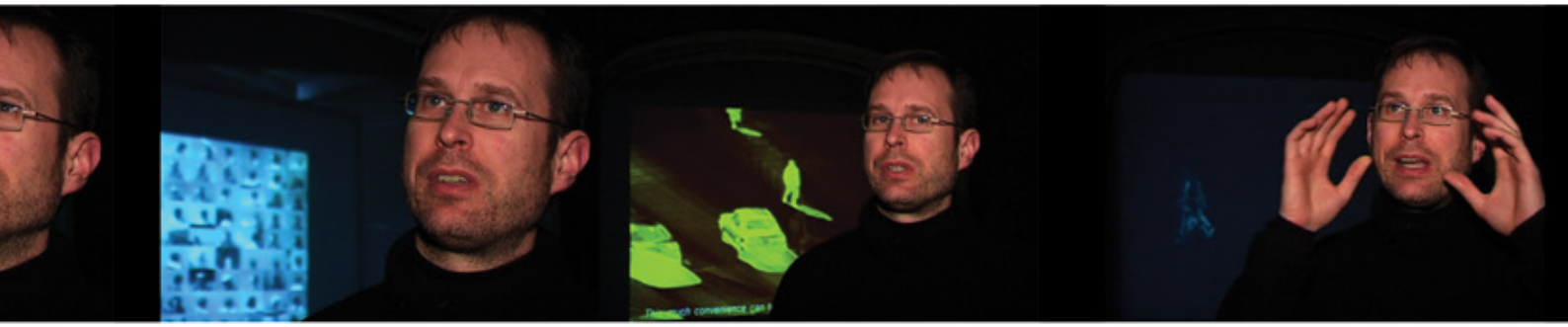
DR: [00:14:15]
I don't think that the message is quite so dark. It's interesting that there is a tension between the individual and the community. There are times when it never quite gets to the chant. There are times when it is a shifting set of alliances, these two who are talking together, these three and this one goes to this group,... and suddenly there is one talking on its own for some reason. It's not quite so rigid. It's not intended to be a depressive comment on the nature of human society so much as a way of looking at the way that we move back and forth between community feelings and individual feelings. And it's not a group of humans, it is a group of computers. It's quite important to remember that; they are computers pretending to be human. In fact you can see the computers because they are hanging in the space. So I am more interested in computers trying to be human than in actually what humans do, because by thinking about, and creating and presenting computers trying to be human, I actually learn a lot about how we are not computers by how my system is different from how we are as human beings. It's a strange way to think, but I think you can use the computer ironically as a way to learn more about yourself as a human being, because you can test your ideas about what you might be and see others fail. I think our ideas about who we are, how we operate are quite simplistic and the computer in a strange way can help us to understand that we don' t really understand ourselves.

XE: [00:15:55]
As a conclusion, are you an optimistic interactive artist?

DR: [00:16:00]
Hey...(smiles). I certainly at many times in my life have been an optimistic interactive artist. I am in general an optimistic person. From time to time, I will be the - what we call in English - the wet blanket, I will be the pessimistic interactive artist because there are lots of optimistic interactive artists and sometimes just out of contrariness I feel like it's time to be the other voice. I think there are many voices in general culture that are quite pessimistic about technology but not many within technology. I think that pessimistic voices are also a useful position. Not to say that technology is bad, but to say we need to look at technology carefully because we are opening our arms to it at very high speed; sometimes in that process we make the bad decision. ¶

This text is a transcription of the interview conducted by Xavier Ess (RTBF, http://www.rtbf.be/) at Theatre Mercelis (Ixelles), where David Rokeby gave a public talk as a part of the iMAL workshop (December 2003). A video of this interview is available at

http://www.imal.org/drokeby/archives/



stills from video (camera Richard Wandel, RTBF)

Interview with Nicolas Collins

by Els Viaene and Dieter Van Dam

[EV&DvD] You were one of the pioneers to use computers on stage. How have your tools or the use of technology changed over the years?

[NC] Well, technologies change pretty fast, so on the one hand I followed advanced technologies. You might have had, for your first computer, one kilobyte of memory in it and the processes were one megahertz and for the storage medium you had a tape. And now, you know, I have a laptop that has so much speed that I cannot reach the limit in my program of what can be done electronically and I know that the technologies are no more limited. In 1978 you had to be a very clever programmer with the computer in order to get to what you wanted it to do. Sometimes you work with cutting edge technology and at other times you realize that old stuff is good and that people are still playing drums. You know, people are still singing. These are kind of traditional instruments and I still work with musicians who are playing more traditional instruments.

Nowadays everybody thinks that a laptop is a musical instrument, right, or something for editing video. Well believe me, twenty years ago nobody thought that a computer was either a musical instrument or a video tool. So I guess we are getting more tools in our hands. A hundred years ago all you had was opera and ballet in terms of multimedia. And now you've got all these other weird forms: television, film, you have video games, you have computer graphics stuff. Maybe we have a few more options now.

Talking about all those tools, you said yourself, there is almost no limit anymore. What is the strength of today's inventions in media art, do you think?

I'm probably the wrong person to ask. Every now and then someone asks me the question what is hot and then I say, 'How would I know, I'm fifty years old, I have two children who occupy all my time'. I'm not the guy to tell you.' I think that what still continues to be the most interesting development in music for me in, say, the last five years, is peer-to-peer file exchange: what that's going to change is the nature of music as a product. I'm very interested in the death of the CD that is taking place now. The idea that you have more and more music that has nothing to do with physical objects, that's just sound files. That nobody cares about imitation or data anymore, nobody cares about what instruments musicians play or with whom they've played before and all these lines of notes are irrelevant. It's kind of a shift in pure sound, a shift away from the object. It's an interesting state for defining music and I think that maybe what will start to happen with peer-to-peer file exchange is that more music will get reworked more, and maybe the distinction between the music consumer and the music maker will narrow even further. In other words, the tools of the personal remixes will enter the point that there will not be a definitive version of a song anymore. You know it isn't up to the artist to release a hit record, it's up to the pop list to make a hundred different versions of that material into a hundred different hit records. I still think that the experimental composers who get deep, deep into the machines come up with interesting characteristic sounds and characteristic images of machines and that a lot of more commercial music just uses the surface of technology.

In Brussels here you participated in the .x-med-k. workshops. What was the workshop you gave?

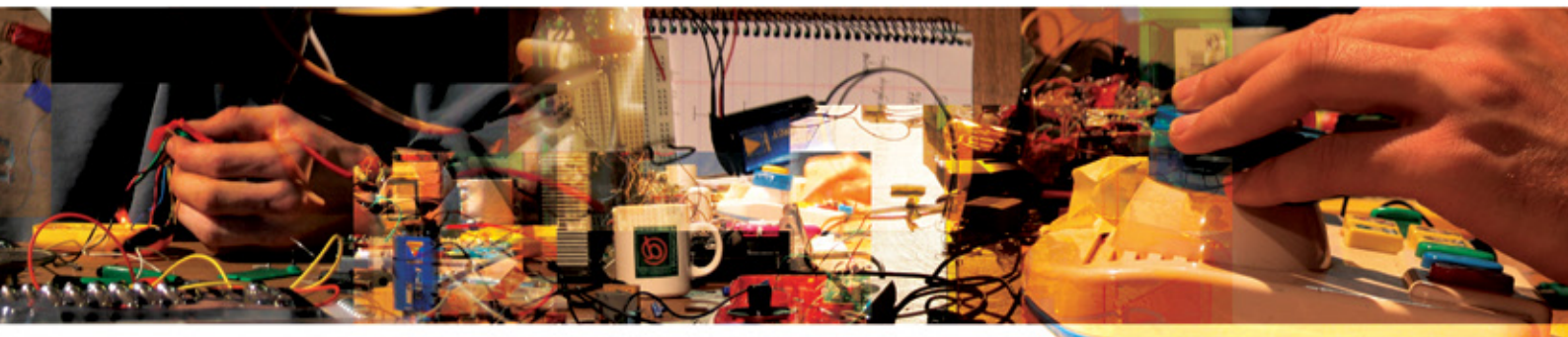
I gave a workshop on hardware hacking, as I call it. Sometimes I feel really old. I feel like, in Japan, you know, you have these living 'national treasures', the oldest living kimono maker or someone who is specialized in tea ceremonies. These are things that are meaningless to most people. They are an obscure part of culture. Possibly like the whale, or the tiger, people like myself are going to be extinct. But the question is, is this important or not? I've never really thought about it; these skills of doing things with hardware at a time when the world thinks about software. But then I started teaching in an art school five years ago in a very computer-oriented program with installations and interactive pieces of sculpture and sound pieces. They were great on all the software and the general fabrications but the

photos by so-on

one problem they always had was interfacing between the public or performer and their sound system. I started giving suggestions to people. Let's say, how can I find a way to turn on this installation when somebody sits down in a chair... Or how can I do a piece such as, you know, the sun rises and the sun sets and the piece changes its sound etc... And I realized that there was an interest in these weird old, what I used to call 'blue technologies', these little technologies connecting. I put something together as an experiment that was a course in making electronic instruments: the ones that didn't have to connect with computers, you could just play yourself. A part of it is just like contact, that everybody needs to do with stuff, a part of it is cracking open things like toys and radios and modifying them. And a part of it is actually designing little things all on your own. You couldn't really make a mistake. What happened was I did a little book for this project and the book kind of got away from me. You know it ran out of the farmyard like a small piglet. Someone caught the piglet and read it and said 'oh, that should be fun'. So I got invited to do some workshops outside of my school, based on this stuff and I think it's started for a year now. First in England then at STEIM and then I did the one for you folks in Brussels.

So do you learn something yourself from such a workshop, from giving such a workshop?

Do I learn? Yes actually, it's been quite interesting because, you know, I'm a performer and most of my pieces of music are not finished when I get up on stage and do them for the first time. Even when they are not pure improvisation, there are a lot of variables in the piece that I don't work out until I'm in front of an audience. Each time you play it you get a little bit better. So I worked out the material in the course in the same sort of way you work out a piece of music. You know this works, that doesn't - and of course it was terrific when I went to write the book because every time I did the workshop I'd come back with a whole list of corrections and editions and changes. That's a great experience because usually when I write I don't have that much freedom to edit and change. I can't ask a hundred people to read the manuscript and read the suggestions. I mean it's impossible. If you get two people to read a book and make suggestions, you are lucky. So, this book that I'm doing on hacking, it's as if I had, I don't know, I must have had by now two hundred students who've read the whole thing and who say 'this part sucks, this part is good, change this or here'. So I learn from it, of course.



You do a lot of writing. Do you think there is enough theory or thoughts about digital media art?

My interest in writing today has more to do with writing by artists about their work and less with critical theory. There was a time in the 1990s when I read more critical theories than I do now. Whether there are enough opportunities to publish work is another question. I mean in a sense my feeling with the web is everyone is a publisher, everybody is a writer, you know what I mean. The question with a journal is, an article is expensive and it takes time to produce it. I mean, is there any point in publishing a journal on paper anymore now that the web is out there? I don't know the answer. I do know that my students love to see things on paper. They spend all their time looking at the web, so what's the result when someone gives them a book on a subject they are interested in? They are incredibly excited and suddenly it's got some kind of permanent quality to it.

The problem is not that there are not enough opportunities to publish. The problem is that it's difficult to find the stuff that's good and the stuff that's interesting. If you can invest a lot of time reading things and then by the end you say, 'wait a second, this is completely unsupported, I've wasted my time', a dumb publisher would have published this. On the other hand on the web you also find eccentrics and amateurs and people who wouldn't be published, but deserve to be published. So it's hard to say.

I don't know if you've already written about it, but is 'digital media' art a proper term for you?

Well probably not because I go back to before digital. I've been doing electronic work for so long that it all started with analogue media. I started working with magnetic tape, with isolators, synthesizers and feedback. Feedback is the most analogue stuff in the world. I'm still working with it in 2005 and I started working with it in 1972. Actually, digital media is a collection of material that in a sense is still coming down similarly to the distinction between analogue and digital, in that new digital media such as file exchange may replace old digital media like CDs or old analogue media like vinyl. But then again vinyl is still a performance medium and is very analogue and live performance is ultimately an analogue event. So even when you perform with a laptop and at the time you've got a pair of speakers in your room, you are dealing with analogue air pressure. So I think that to call stuff digital media in a sense you rule out the idea that a lot of the content is very much about physicality, about optical saturation from light, it's about sound pressure, waves hitting your ears or the other organs of your body. Those things are not digital, those things are very much analogue and working in a physical world. So I don't know, I don't think that 'digital media' is a terribly useful term.

What is the main goal in your work right now?

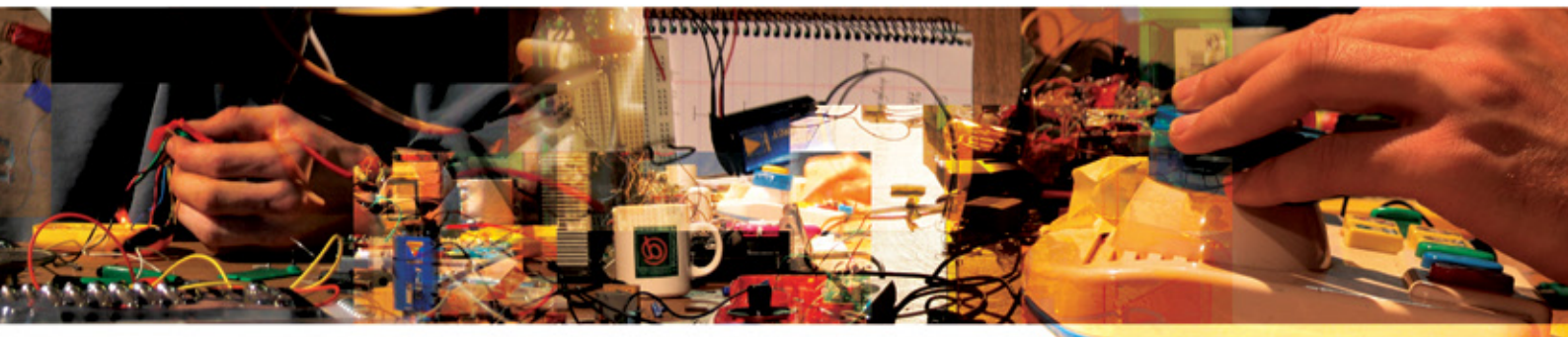
In terms of my art goal, for many years I had a very strange instrument that I originally invented in 1987 or 1988, which was a digital music system that was controlled from a trombone and the slide of the trombone acted like the mouse on a computer: you press buttons on the slide and the music changes and if I'm clicking and dragging with the mouse, then the sound will play back to a loudspeaker... so it's almost an acoustic instrument, though we would say that there is electronic sound coming out of the bell of the trombone. And then you can choose mute to change the sound and you can aim it round the room and by moving the slide you would change the filtering of the sound. I mean it was very physical, not very loud but it's a charming instrument. The first one I built got run over by a taxi at Schiphol and then I replaced that one with one I built in the mid-nineties when I was at STEIM. And then that one... what I'd like to say is it has just to decide to retire before it gets so old and people forget how beautiful it once was. Now I'm working on the next generation of this instrument, because try as I might to get away from it and get into other systems, it remains a sort of fundamental aspect and as an electronic controller remains very central to a lot of my ideas about music, which have to do with small changes in sound. Performing somewhat the way you listen to things rather than the way most music is performed, creative listening. It's about spending some time trying to get that put together. It's a wonderful combination of programming and building hardware.

Sounds nice.

photos by so-on

We talked about the past and the present of multimedia, what do you think about the future?

The future of multimedia? I think that generic products like videotapes and videodiscs and CDs and records will kind of disappear or become very, very disposable, less valuable objects. When I was a kid growing up, the record was a very valuable object. You know when you bought a record... the sort of fetishism of vinyl. And the longer I live, the less fetishistic the object has become. I think it's sort of going to be replaced by the artistic object, you know, an object in its own right. An object, it might have a CD, it might have a DVD, it might have like some kind of file, but it will be in some beautiful package. I think you will get beautiful packages and nothing else. I also think that with any luck people will finally start to use the web as a means to generate a community that goes beyond chat and instant messenger. And that there will be some more interactive media on the web. I'm not sure about that, it could be that it's too idealistic. And then I think that performance is going to remain important; I think that the performance itself will become more and more special, different from things like records and files. It's not a question about pop artists on stage and trying to imitate their CD or their mp3. It's going to be about 'let me give you something on stage that is nothing like what's on a record'. So you will think that it's important to spend money and come to see me. Because in the end we are talking about a capitalist art form. You know commercial music is ultimately going to define a lot of the principles by which we evaluate what is music today. It's just like film. Commercial film is going to determine what it is we think of this film. And I think that when these people start to lose money through file exchange they will try to come up with grand spectacles that can be swapped online. ¶



code31

dynamic definition

code31 *is an open studio for research, development and discussion about techniques and methodologies in media art. It is an initiative which stimulates interchange between several artistic disciplines and serves as the space needed to experiment with new technologies.* **Code31** *gathers artists, engineers and scientists: people who concentrate on the symbiosis of art and technology, through experiment and reflection.*

diversification

code31 meetings don't fit one theme, nor one fixed technology. Content and research domains depend on the people present at the meetings. Every participant comes with his own interests/projects/context. Everyone contributes by sharing their know-how and knowledge with the group, as well as formulating problems, questions and early ideas. This approach leads to a dynamic research pattern which touches upon very diverse aspects in the artistic and technical evolution.

collaboration

The existing diversity in (digital) technologies makes it impossible for the individual artist to have an all-encompassing overview and in-depth know-how or even acquaintance with the tools. During the development of technological projects, the artist gets confronted with aspects beyond personal technical knowledge. ***Code31*** stimulates informal bridging, a continuous flow of ideas and knowledge.

meetings

The main set-up is the openLab: a weekly meeting where artists can experiment and develop and discuss the feasibility of their media art, as well as teach, learn and develop new technologies.

Interested participants are free to join the weekly sessions. Questions and answers, problem posing/solving and development are researched and shared with fellow artists, designers and engineers.

In this way, media artists build their own technical workspace and initiate collaborations, navigating through a landscape of technology. With our philosophy of teaching one another, ***Code31*** has grown to become something akin to a tech self-help group.

projects/workshops

Code31 is not directed towards production nor realization of finished products. It's aimed at confronting tomorrow's reality and ideas with today's technology, choices and options. This does not inhibit outcomes in form of public events. Experiments and research can take place in a public context, confronting and studying feasibility.

Problem-solving in a group can be interesting, but sometimes it requires additional, specialized knowledge. The meetings with specialists are organized in the form of workshops. To ensure continuity of knowledge-spreading and transmission, we use an open website (wiki). This is our dynamic archive of shared knowledge, open to the world.

Our main fields of attention are: audio/visual computing, open-source software, DIY, robotics, electronics (mainly digital), code hacking.

network / node

The collaborations appear on several levels - local and international, physical and electronic. ***Code31*** forms a natural node in this network. The structure of the open studio implies a very strong local binding, while facilitating global collaboration with similar organisations as well. ¶

photos by code31

nadine: QUESTIONS

How d
op

nadine would like to look into three (3) key areas:

1 (one)

nadine wants to offer artists the opportunity to escape the rat race of creation and shield them from productional pressure demanding new shows at set times. The question remains as to how *nadine* can best take on this responsibility. How can we create a place for work that is not production-oriented? How can studio work nevertheless be communicated to a wider audience of artists, spectators, or interested members of the public? If public showings do not always respond to the need for openness and communication, what other tools can we develop? How can the digital archiving of working processes play a constructive role in this and provide more insight into them? Moreover, how can this be done in an accessible, understandable way that may also lead to the development of a new line of questioning? How can the process be made visible in a dramaturgical, technical, artistic and productional way?

2 (two)

If the archive can play an important role in the development of artistic questioning for future artists or projects, then how should this material be made accessible? How can an artist, confronted with a particular question, benefit from other artists' earlier work in this field? Would a publication or a DVD be the right choice, or should we be looking for interactive meetings amongst artists, theoreticians, and technicians? How can an archived process contribute to further research? Is the use of the internet (wiki, streaming, chat, ...) a valid starting point, or do we need a more analytical approach to render the material useful? Is this analysis limited to a single project, or does this sort of research only gain validity within a longer research period combining various processes and solutions? Can we detect a void on the level of guerrilla publications and communication? And, what shape would such communication take? How do you get the right information through the right channels to the right people?

3 (three)

What is the status of the artist as an author at a time when many artists develop their practice collectively? How do we deal with open structures? How can we best create a context for the proliferation, the constant mutations within all artistic work, without succumbing to virtual, disciplinary, or theoretical limitations? How can we work on the results of a process that rejects all forms of limitation (be it that of participants, place, materials, output, or artists), as any given project can simultaneously occur in both real and virtual space, over here and on the other side of the world, and can be passed on from one collective to another ...?

A POSSIBLE DEFINITION:

nadine is a transdisciplinary **(1)** laboratory **(2)** for contemporary **(3)** artists: a place where innovative work can be created, supported and presented. nadine wants to provide continuous support **(4)** for innovative - and therefore often risky - projects that need the right context in which they can thrive. By developing its own methodology for artistic research **(5)** and explicitly focusing on the artistic process **(6)**, nadine wants to question the present production practice (7) of the arts sector and join artists in their quest for an open **(8)** and flexible (9) structure that can incorporate both internal questioning and wider external communication (10).

lo we deal with
en structures?

(1) TRANSDISCIPLINARY

Mutation of artistic disciplines. Transdisciplinary practice implies complete and fundamental fusion of art forms, both in the production process and in the results attained. Artists who question their established practice by engaging in another - e.g. the dancer who questions his live presence on stage by confronting it with a recorded video image, or the stage director ending up making a visual art work by distilling a single theatrical image - are a case in point.

Collaboration. Another kind of transdisciplinary approach lies in the pursuit of non-hierarchic collaborations between artists from various disciplines, who during the working process both undermine and strengthen one another's methods.

Presentation practice. The transdisciplinary approach also forms the basis for *nadine's* presentation practice in the sense that art forms are presented in a way they usually are not. A visual art work may be staged as a performance, or a concert as an installation. In this case the transdisciplinary approach perverts the individual art forms and involves the audience in the experiment. The way something is presented can often be as important or even more so than the thing itself. *nadine* provides a biosphere where artists can allow their ideas to mature, where mutations and confrontations between individual artistic disciplines and ideas can come about.

(2) LABORATORY:

Half-open workplace, aimed at developing research. The laboratory is a 'closed' place for research in the sense that it is shielded from the pressures of production and public expectations. It is an 'open' place in that it provides opportunities to communicate the development of research within the working process to a wider audience. Process-oriented work has become increasingly prominent in contemporary arts practice. In the wake of this phenomenon a whole new jargon has been created in an attempt to define the new trends within collaboration, creation, and research. However, the exact meaning of terms such as 'laboratory', 'collective research', 'informal showing', or 'work in progress' remain largely unclear despite the fact that they often serve as legitimization in programme notes, institutional declarations, subsidy applications, and artists' project descriptions. This discourse of legitimization often seems to lack a clear standpoint or definition. For what exactly does it mean when an organization (a theatre, production unit, workplace, ...) says it aspires to function as a laboratory? If we compare the artistic 'laboratory' with its scientific equivalent, the two entities seem to have little in common. The former rarely implies clearly set-up experiments, a fixed period of tests or the corroboration of results, or even the setting of objectives. In the artistic context research often gets stuck in the trial-and-error phase of the initial set-up: an open environment, which at the best of times is only focused on its own functioning and shares this starting point with specialists from various disciplines. In other words, the 'arts laboratory' has so far failed to develop a specific methodology, either because there is no clear method, or because it cannot be applied to artistic research. In order to allow the laboratory to function as a half open space, a number of criteria have to be respected. For the time being we'll call them: time, necessity, specialized input, analytical feedback, written or visual output that can be consulted and communicates the internal research to a larger community.

(3) CONTEMPORARY:

Contemporary artistic practice is characterized not only by the hybrid and complex mutations of individual disciplines, but also by the disappearance of the boundaries between art and science, research and production, process and creation. *nadine* wants to play a role within this constantly evolving context by allowing artists to go beyond the established limitations of their field and placing new possibilities within their reach. In contemporary artistic practice new media, performing arts, and visual arts are inextricably linked. This creates a constantly evolving field of action where not only the technical means for creation can be developed (for, ultimately, this is of secondary importance), but first and foremost installs a totally new artistic practice with its own susceptibility, logic, and meaning. The results of this kind of research into, for instance, new digital media are integral to *nadine's* public programme.

Contempora
arts prac

(4) SUPPORT:

Making available appropriate tools for the development of each individual project. The context of transdisciplinary research and experiment makes professional support indispensable. If *nadine* intends to continue developing work that focuses on research and help artists to avoid the pitfalls of easy effects so often associated with new media or transdisciplinary projects, they must be given the necessary tools to deal with ground-breaking research in an interesting way. In the immediate future the level of knowledge required for this must be brought up to the same level as in neighbouring countries. Rather than trained technicians, we should focus on interested artists. *nadine*'s workshops are aimed at artists with the creative potential to transform this knowledge into innovative projects.

(5) RESEARCH:

Research is the development of a methodology to question artistic practice, the results of which can afterwards be shared with and consulted by a larger community of artists, writers, theoreticians, and the public.

As a result of the uncritical way this term has often been used in the artistic practice in recent years and misused to describe vaguely defined work periods with equally vague results, any possible definition of the term must be kept as simple as possible.

A POSSIBLE DEFINITION:

nadine is a transdisciplinary **(1)** laboratory **(2)** for contemporary **(3)** artists: a place where innovative work can be created, supported, and presented. nadine wants to provide continuous support **(4)** for innovative - and therefore often risky - projects that need the right context in which they can thrive. By developing its own methodology for artistic research **(5)** and explicitly focusing on the artistic process **(6)**, nadine wants to question the present production practice **(7)** of the arts sector and join artists in their quest for an open **(8)** and flexible **(9)** structure that can incorporate both internal questioning and wider external communication **(10)**.

(6) PROCESS:

Activity developed during a set amount of time, required to develop material based on a predefined line of questioning (which can be of an artistic, theoretical, or other nature). Naturally, this process implies that the original line of questioning may be reformulated, transformed by the insertion of various factors, such as the confrontation between various working methods, backgrounds, and conceptual ideas of participants (which obviously becomes all the more probable within an 'open' process). The process can never be considered a result as such, but archiving the process can provide an interesting insight into the development of the artistic creation in question. However, opening up the doors of the workplace is a precarious matter, as what is shown may still be at a fragile stage, often unable to hold its own. The spectator, therefore, needs to be thoroughly informed (through publications, interviews, conversations, definition of the terms of reference, documentation, ...).

(7) PRODUCTION PRACTICE:

Practice of producing artistic work, including financing, sales, touring, technical production, etc. It is most often defined in terms of the methodology of existing structures or subsidy systems, the production systems within institutions, the available time for technical set-up, touring schedules, financial pressure, time limitations, ... this is precisely where arts centres and workplaces could play an important role by developing 'flexible' production methods to counter the limitations imposed on artistic output.

ary transdisciplinary tice (...) necessitates a flexible approach.

(8) OPEN:

Non-hierarchical working method aimed at expanding the horizons of artistic practice: beyond the limitations of space (collaboration with people who may not be physically present in the workplace), familiarity (by inviting people who haven't started up the process themselves to collaborate), and objectives (as the possible extension of the work group and the non-hierarchical structure of the process may reorient the result). An open process does not automatically imply a research project, as it may very well aim at a public presentation that might not be related to the development of a discourse, theory, or methodology. Therefore, the 'openness' of the project is determined by the communication of its development, rather than by the physical presence of an audience, participating or otherwise (as is the case with 'showings' or 'open laboratories'). An open work form involves various ways of informing possible participants (email, streaming, daily publications on the net, wiki, ... or public presentations) about the development of the creative process. In this way a second 'audience' can be created, consisting of people who are interested in following the process at a distance. They depend on the transparency of the communication process; there can be no question of 'openness' if the process is being communicated through unintelligible or obscure language. This is where artistic archiving may become significant, by looking for ways to share work and thought processes and allow them to be consulted by a wider audience. In this way 'openness' can be guaranteed through the continuous development of lines of questioning by different audiences and artistic projects.

(9) FLEXIBILITY:

Contemporary transdisciplinary arts practice (which is not limited to the mutation of artistic disciplines, but is situated at the interstice between art, politics, biology, sociology, philosophy, ...) necessitates a flexible approach. This does not primarily concern the practice or reflection of the artist or collective (who clearly make their own choices), but rather the organizational structures of theatres, venues, arts centres and institutes, which require constant redefinition of working methods, production rules, presentation structures, and modes of support so as to respond to the needs of the field. This has also resulted in many arts centres' and laboratories' communication structures coming under fire for being inappropriate to contemporary artistic practice.

(10) COMMUNICATION:

Methodology for the (development of) sharing the artistic practice with a potential audience. As *nadine* focuses on process and research, its public function cannot be limited to the organization of informal showings. *nadine* intends to make use of alternative communication strategies, such as a participative wiki (a simple database/website which artists can use and adapt themselves) and streams on the internet allowing the public to follow the processes at a distance. Another valuable means of communication is the establishment of an archive that not only documents the development of various research periods, but also makes them accessible through the website, regular publications, and the production of a DVD per project. All this material is collected and permanently available for consultation in our public lounge. During the projects themselves regular meetings between artists, writers, critics, and scientists are organized. Depending on the project the right people are sought to provide feedback on the process, and the know-how of the researchers is also made available to a broader community through meetings, workshops, wiki conferences and the like. ¶

http://www.nadine.be

On Borders and Edges

FoAM

Mixing realities is a practice still in need of deep investigation and ground-breaking discoveries. Hiding in the gaps between specialised and disciplinary knowledge, inspiring mixtures are drawn out by heterogeneous teams of artists, scientists, anthropologists, or even cooks. Several artistic and scientific groups are working out their own approaches, their particular concoctions of technologies and media, shared among the small network of collaborators and sympathisers, but too few of these developments are currently accessible to artists with no prior knowledge about the mixed reality (MR) field.

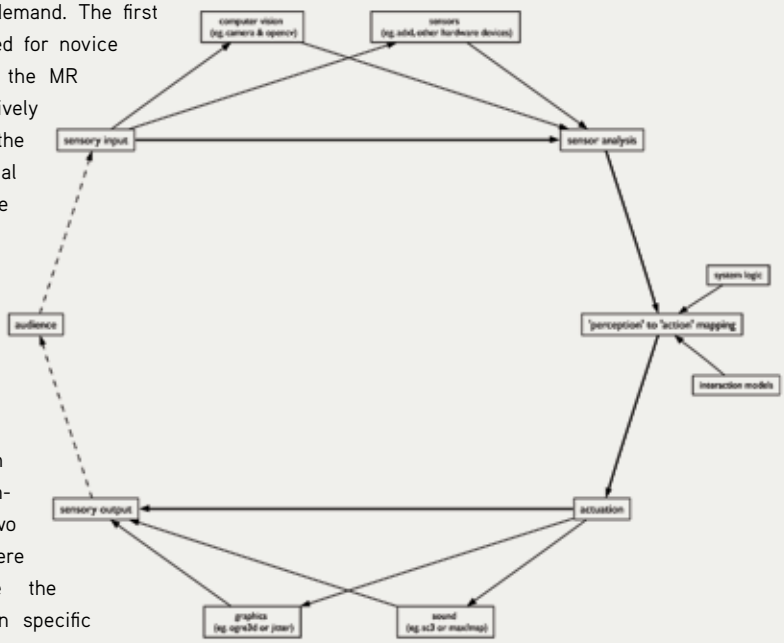
Technical issues are often the first barrier to understanding the MR 'how-to'. Presently, there is no single system that an artist can use as a MR 'mixing desk'. There are usually arcane brews of hardware and software developed by both multinational corporations and 'one kid in their bedroom'. Once the initial technological challenges have been met, other complementary skills are required before an artist or scientist can venture into the blender of realities. Finding and mastering all the bits and pieces needed to get the physical and the virtual to converse is not a trivial task...

In order to provide an introduction to the MR field for artists and enable learning of new technical, conceptual and collaborative techniques, FoAM designed and organised four workshops as a part of the .x-med-k. series. The following pages look back at the methods used during the workshops, designed to draw attention to the entanglement of a plethora of technologies used in mixing realities, as well as the social and professional skills that collaborative productions demand. The first two workshops, designed for novice practitioners, looked at the MR phenomenon on a relatively high level, sketching the digital and the physical worlds separately, while discussing and designing ways in which the two could mix. The text about these workshops is woven through with excerpts from radio interviews with their coordinators, Julian Oliver and Yon Visell (conducted by **okno**). The two workshops in 2005 were master-classes, where the participants would learn specific techniques which are not often taught outside of academic institutions. We taught the basics behind designing active (or 'smart') materials and computer programming for real-time animation. Articles by workshop leaders and participants, reflecting some of the topics which guided the workshops, are included in this publication.

: a travelogue through matter and media in mixed realities

Learning and Unlearning in .x-med-k.

The first workshop in 2004, 'Defying Physics: MR media worlds' was coordinated by Julian Oliver, Nik Gaffney and Maja Kuzmanovic. The applied part of the workshop involved developing a virtual environment that could respond to physical movement in real time. With this focus, the workshop was primarily exploring the field of 'augmented virtuality'. Facilitating the second workshop 'Responsive Environments' were Yon Visell, Nik Gaffney, Lina Kusaite and Maja Kuzmanovic. This workshop involved two groups of participants, each designing a prototype for a responsive environment with



Example MR system driving FoAM's trg environment. Diagram by FoAM

an equal mixture of real and virtual, thereby focusing on the field of 'hybrid reality'.

Yon: I think it's quite different to some of the other workshops which are targeting more specific technologies, because our domain was really in terms of how things can respond to you, what are the qualities sensing, of responding and of changes that you can make to the surroundings.

The two master classes held in 2005 were designed on the basis of our experiences in the first two workshops, following suggestions from the participants and facilitators. We changed scales and looked at the constituent elements and fundamental principles of the different worlds we wanted to mix: active materials (or soft-wear) and software. Before venturing into spaces on a human scale again, we decided to observe and dissect the methods and materials that can make smoother, stickier reality emulsions. With Joey Berzowska and Rachel Wingfield we explored the thin line between media and new materials, specifically focusing on textiles and flexible displays. Dave Griffiths and Nik Gaffney lead us to another 'soft' space – where we conjured up responsive graphical worlds using 'fluxus', a live-coding tool for realtime animation.

All workshops were composed of hands-on sessions, targeted towards development of small, experimental prototypes, providing an opportunity to solidify the participants' knowledge, while also learning additional techniques particular to MR technologies. The workshops were set up to encourage teamwork and sharing of skills and knowledge between the workshop leaders and the participants, but most importantly between the participants themselves.

Yon: That was the idea – to get people involved in it, talk a little about it and see once we mixed them all up, what they would come up with. We were the ones who provided the participants with the tools, but also words, thoughts and imagery, that have mixed with their own experiences and influenced whatever they were doing.

Defying Physics: MR media worlds

Julian: I'd like to be able to take pretty much anyone with minimum computer experience and turn them into quite a competent developer.

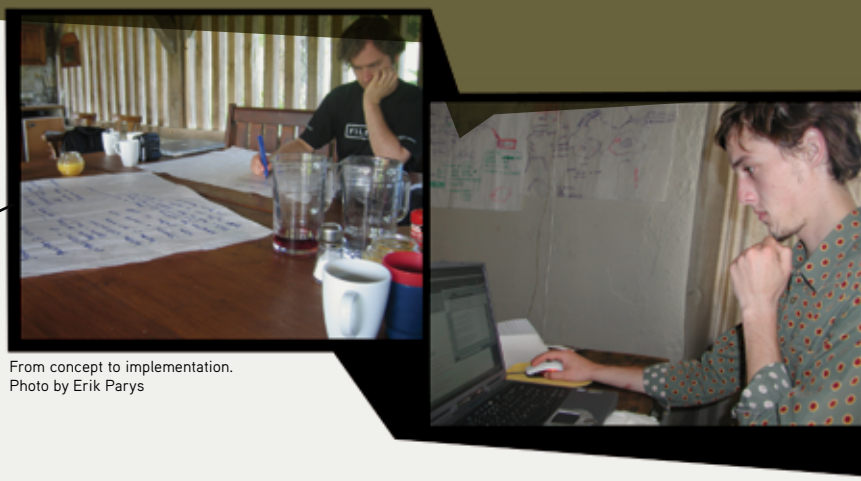
The Defying Physics workshop was organised in July 2004, in Château de Halloy in the picturesque Ardennes region in the southeast of Belgium. During the workshop we wanted to play with responsive media able to change their behaviour based on the input from the physical world (such as physical movement, biometric, geological, astronomical or other parameters). The workshop involved a combination of artistic presentations and screenings, free-form design sessions, discussions, concentrated tutorials and hands-on development.

During the intensive nine day workshop the participants worked in an interdisciplinary team to design a media world using the site of Halloy both as the source of inspiration and the reality in which the media would be 'mixed'. In the process where learning and applying the knowledge occurred almost in parallel, the participants were exposed to different methods used in collaborative, site-specific concept development and design.

The workshop started on a Saturday morning, while sipping coffee and learning about the site from its history and legends, as revealed to us by local historian Leon Descy. A more personal atmosphere of the site was soaked up during a psychogeographic drift, after which we engaged in the making of subjective maps and trajectories. Through this simple low-tech exercise everyone became acquainted with each other's interests, perceptions and ways of visualising the experience of navigating through an unknown territory. During this process, a rich collection of raw materials, visual impressions and sound recordings was gathered, and later used as textures and samples in the media world. The challenge began when we attempted to visualise the surrounding in collective mind-maps and conceptual diagrams. These techniques helped us reach a collective vision of what a 'virtual extension' of the site might look, sound and feel like.

After designing the imaginary extension to Halloy on paper, the participants were acquainted with the principles of 'mixed reality' systems. In this process, they were introduced to open source media tools such as:

- Blender, a software package used for developing 3d graphics, 3d animation and timeline editing
- nebula / fijuuu, a game engine with a custom extension for audiovisual performances
- pure data (PD), a realtime visual programming environment for audio, video and graphics
- Audacity, application used for audio editing
- Gimp, a free Photoshop equivalent for still image manipulation.



From concept to implementation.
Photo by Erik Parys

Before venturing into spaces on a human scale again, we decided to observe

Julian: We were looking at free software tools specifically for artists. There is enough energy there, enough demand.

The choice of open source tools was a conscious decision to introduce the artists to the idea of software that could be used without necessarily requiring a financial investment. Moreover, such software can be further developed by the artists themselves (or by their more technologically skilled collaborators), if they wanted to add or change particular functionality. During many discussions it became apparent that the participants preferred using a mixture of open and closed source tools. By comparing proprietary software (such as Max/MSP and Jitter, Photoshop, Maya etc.) with the freshly learned Blender, PD and Gimp, most people came to the conclusion that it would be worthwhile to invest time in learning software that was not burdened by proprietary licenses and high cost.

Julian: It's a case of who defines our practice and who defines the shape of our output. This is not asking that everyone becomes a programmer, but everyone can have some influence (or the possibility of influence at least) to produce an alternative studio, a studio that better suits our needs.

In order to put their knowledge into practice, the participants were given the task of translating their site-specific concepts into an implementation of a simple prototype for a media world. The 'tangible' outcome was a prototype media environment, designed as an infinite cave, with walls constructed from computational equivalents of stone, fallen branches and mud, sedimented with fragments of natural and cultural detritus. The players entering the cave would hover, drift and spin through the dark space, attracting a swarm of fireflies by exploring the contents of the cave. Fast and energetic movements would send the fireflies buzzing to the far sides of the environment, allowing for a few seconds of undisturbed exploration, after which the flies flew around the player's viewpoint again... The players wore a small computer, with sensors able to measure acceleration and orientation of movement, which were translated in realtime to the orientation of the 'cave' and the dispersion of the 'fireflies'. This little world was projected onto a semi-transparent screen stretched across one of the old passages between the main château and the garden. We experimented projecting on the walls of the buildings, on the white clothing of the participants, who (towards the end of the evening) decided to become moving, flexible screens.

The workshop leaders wore many hats as the week progressed - sometimes as tutors of particular software, other times co-developers, other times facilitating social events and movie screenings, as well as gathering food in the nearby woods and catering for the group. The fact that the workshop was taking place in a remote location meant that the participants and leaders were working together, as well as sharing food and accommodation, mixing education with socialising. The discussions and development sometimes continued throughout the night, as the atmosphere was devoted to collaboration and learning.

Even though the workshop did not have the pressure of a public outcome, the process evolved in an intense way, through the typical curves of collaborative design condensed into the space of a few days:

- from creative drive and energetic motivation to frustration with limitations of technology, to seeing these limitations as a way to focus the artistic visions;
- from a visionary concept to a focused, but extremely limited implementation, emphasising the importance of functional sketches;
- from exhilarated ideas to cross-disciplinary disagreements, which lead to a wider understanding of the approaches involved;
- from resolution to despair when confronted with technological challenges, to appreciating the value of improvised solutions and compromises;

This process culminated in the presentation of the prototype, which was a humorous and entertaining social 'event'. The workshop finished with the freshly invented game of 'blow-ball', played until the last evening had become early morning, after many courses of barbecued delights had been long digested.

Responsive environments

Yon: Responsivity is a kind of subset of interaction that moves away from normal human-computer interaction to more interesting things involving the movements of the body and things like that... Retrospectively the aim was to take a bunch of artists who are interested in the topic and all together think about the possibilities for responsive environments in an artistic sense.

The workshop was held at the FoAM lab in Brussels, in November 2004. Following the legacy of the Defying Physics workshop, 'Responsive Environments' was geared towards expanding the participants' knowledge of the MR field. The hands-on sessions were setup to solidify and bring together newly acquired technical abilities with the artists' professional knowledge, encouraging the application of old and new skills in a collaborative process.

Blow Ball. Photos by Sara Nuytemans

and dissect the methods and materials that can make smoother, stickier reality emulsions.

Yon: I'm not sure what we taught them. I think you always learn something by being able to observe such a situation. For me it's really fascinating to observe the participants working together and negotiating about their project. It was great watching what people come up with in terms of composing their own constraints and how they conceive of something which has to be concrete. I think a lot of their time they spent cutting their ideas down into something they can work with in terms of techniques, or working with things like sensing.

The workshop began with lectures, artistic presentations and technical demonstrations, followed by the collaborative design and implementation of two prototype responsive environments. To complete the development process, the participants choreographed semi-public usability-testing sessions, based on FoAM's ethnographic methodology, previously used in several research and production projects. In order to follow this ambitious path in a flexible and productive way, the group had to commit to a process of collaboration, enabling each participant to have enough space for individual contribution and responsibility, while working towards a shared vision. Everyone was there to learn about working in heterogeneous groups, with people of varying levels of technical knowledge, thereby understanding the complexity of making rich, interactive artworks, where nothing is 'a mere matter of implementation'.

Process, responsibility and play

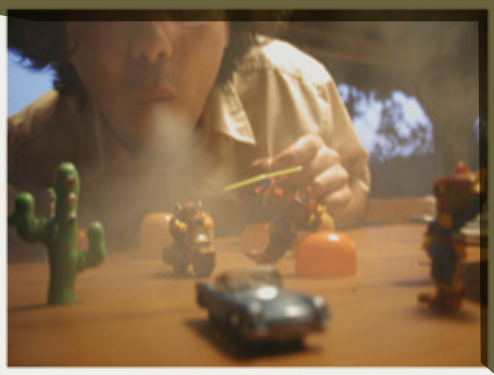
The workshop coordinators set ground rules, to ensure sufficient freedom for exploration, while keeping the group focused on the tasks at hand. The five guidelines for 'open-space' collaborative workshops (used for conflict resolution and problem solving in large groups) seemed to be most applicable:

- whoever is present, they are the right people for the project at hand (design a project around the people and their skills, rather than pressing requirements on people without the appropriate skills)
- whenever a process starts, it is the right time (even if it starts on the last day)
- whatever happens, it is the only thing that could have happened (no regrets)
- when it's over, it's over (if anyone does not feel comfortable, interested or motivated, it is OK to leave)
- do what you need to do, and go where you need to go, but don't waste time (everyone is responsible for their own quality of work and experience).

We began by giving an overview of the field of mixed reality (together with its artistic applications), along with more theoretical discussions about the processes and technologies involved in sensing and perception.

Yon: For me what is important are not the distinctions between individual senses, like sound versus vision. Because the ways we perceive the world around us and the ways we interact with it aren't based on one sense. Something like a microphone has a tangible, visual experience and then touching it and hearing it are other important aspects of this object and it's not possible to separate them completely and to preserve its 'nature'. I feel that it's not in the nature of the world to talk about the senses in a divided way. There are lots of correlations to that idea in perception and they haven't been really reflected in engineering, but it's an interesting emerging field.

Specific attention was paid to the methods of translating actions in the physical world (such



Experiencing the worlds. Photos by Sara Nuytemans and Erik Parys

as movement, speech, breathing...) into data able to be used to shape generative sound and graphics. The workshop was targeted towards learning about various approaches to interaction and responsivity, exploring the interfaces between physical and digital worlds. Interaction focused on co-construction was a basic principle used to describe three aspects of the workshop: (1) the relationship within the collaborative teams; (2) between team and the public; and (3) between different technologies and media. In terms of technology, the workshop leaders paid extensive attention to the link between the hardware used for input from the physical world (sensors, cameras, single board computers and PIC-chips) and software used to generate responsive media output (mainly Max/MSP and PD). Processes of sensing, perception and translation of 'real-world' information into digital media were discussed at length, followed by a technical demonstration of methods for sensor-data analysis in software. These demonstrations were focused on technologies that the participants could use later in the workshop to develop their prototype environments.

Yon: ... when it comes down to the engineering part of it, it is easy to explain the sensing technologies, because then you can say - Here is the sensor and this is what you can do with it, this is how it works, this is how to get it to do something very simple and controlled.

To begin the practical work, four themes were chosen to guide the design and development of the prototypes: recycling, force, tuning and (dis)integration. On the first day, the participants were given a 'homework' assignment, which involved bringing textual, visual and sonic material associated with one or more of these themes. On the second day, a mind-map was made using these materials. The participants then separated into two groups, each of which focused on translating a section of the mind-map into a design for a responsive environment.

For the following four days, the groups were designing, redesigning and implementing their visions, shaping them into the two prototypes. The process involved:

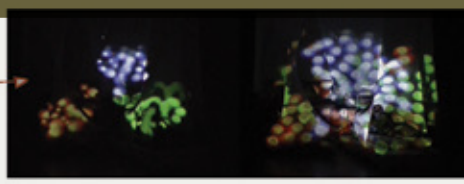
- agreeing on a concept
- translating the concept into a feasible design
- dividing the tasks
- working on the different components individually
- integrating the components
- calibrating the media output
- testing the prototype
- improving the design
- removing the errors and bugs
- testing again (as long as time permits)
- presenting the results
- evaluation.

Yon: You perceive the environment, you understand the relations of things there, you process it, say what is moving, what is there. But then the environment itself becomes an intimate part of your perception about it. Because the mind really isn't very good at keeping an abstract count or keeping track of what is going on in space and so the space is always a representation for this kind of processing that goes on. The most important thing is that the space acts as a kind of memory for itself because the mind is not very good at remembering the huge amount of rich details that are present in the world. So that presence in the world is crucial for its own remembrance. You can extend that idea to things like different mental processes. This is interesting for active/responsive space, regarding the way that spaces are already activated by the mind. In a sense responsive environments are already a domain in which much of the thought and imagination take place. When you think of imposing some other active system on top of that, there is a negotiation that takes place and complex relationship between what is real and what isn't.

Even though the participants were aware of the tight timeline, the design and discussion process lasted for several days, with the implementation being left until the last moment. On the last day (according to schedule), the development process was abruptly stopped in the early afternoon, when the participants experienced the horror of a 'feature-freeze' instituted by the workshop coordinators. Feature-freeze is a well known term in software design, meaning that no additional features can be added after a particular moment in time – 'what's done is done'. The only thing that can still be worked on is the very important, but often neglected calibration between the different components of the system and bug-fixes. This was the moment when all media and materials had to come together, resulting in a coherent interactive experience. As in any production, the first attempt at calibration is always difficult. For example, parts of

Excerpts of the mindmap. Photo by FoAM


Testing the Cocoon. Photo by FoAM


Ze Big Bang. Photo by FoAM

the process evolved in an intense way, through the typical curves of collaborative

the software didn't want to communicate with each other, connecting the sensor input to the media caused unpredicted effects to disrupt the carefully composed visual output. Some feedback loops simply didn't want to loop. These problems required swift improvisations which gave the environments the appearance of coherent entities, but made them fragile and quite prone to crashes. Even though there were a few minor glitches, the installations were functioning for an entire evening.

Yon: ... you are seeing results, you are experiencing results that aren't what you anticipated and it gets fed back into refining whatever it is you are trying to do.

Two curious prototype environments were presented. One of them was a meditative space, where the rhythm and the volume of breathing was translated into an escalating response in visuals and sound (to the point of 'ze big bang' when the experience was explosively reset to the beginning). The creators wanted to convey an experience in which 'inactivity does not mean passivity', where interaction was designed around unconscious human actions, such as breathing, blinking and the beating of the heart.

Yon: Your mind is in the space. The space is the place to experiment and play. In addition to being vibrant and physical, play can also be a deeply cognitive process.

The environment was designed for three players at a time, laying on mattresses, surrounded by slow, stretched-out sound-scape and curved, semi transparent screens, on which the breath became visible as a play of multi-coloured boids (a-life technique, simulating flocking behaviour).

Yon: One group worked with breath sensors. There were two different kinds of breath sensors used in the workshop. One was connected to the movements of your chest and the other to the volume and frequency of your breath. The other group worked on visually tracking movements on a kind of cushion that they put together within a soft cylindrical space.

The other prototype was designed for more active players. The group wanted to amplify the varying motions of people's sitting behaviour. The installation consisted of a stretched fabric cocoon, able to function both as the input interface and a projection screen. It was designed for one participant at a time, whose movements were amplified and processed to become an abstract audiovisual environment.

Ethnomethodology

The workshop was designed to stress the importance of prototyping and testing, to the point of involving the audience in the development process. Two of the participants (one per group) were introduced to different methods of usability testing. The most appropriate for the installations at hand was the 'ethnomethodological' approach to testing human-computer-human-interaction – looking at the ways in which people make sense of their actions in a social setting. The participants designed the procedures according to which the two groups would test each other's installations in order to learn how the installations were used and how closely this followed the design (or diverged from it). The two 'ethnomethodologists' had their hands full with notes, cameras and most difficult of all – an impatient audience.

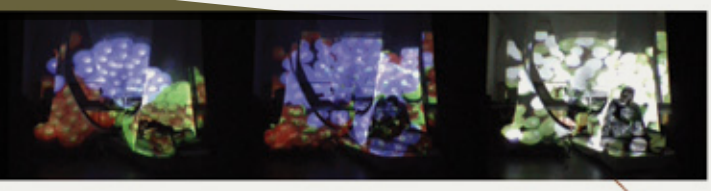
Yon: We can influence participants' perception. You can't control people's behaviour and it's actually difficult to communicate to people that you truly don't want to control their behaviour. It's maybe one of the challenges that you are trying to design without constraining people to a narrative. So you need a more sophisticated methodology actually to evaluate... once you got it open to the public you should observe what people do and try to understand what's interesting there. I mean it's a little bit weird that way because it's like positioning yourself relative to the experiment and this work should not be an experiment on people. They shouldn't be just lab rats...

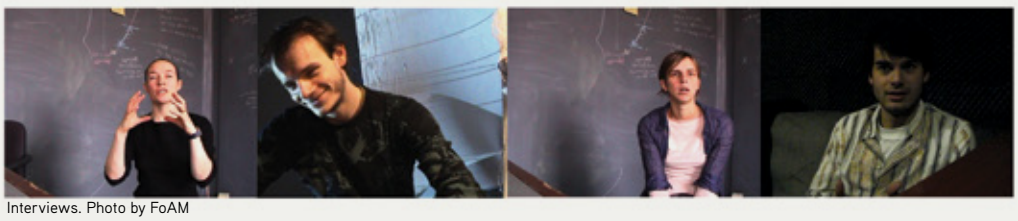
Several people passed through the installations and it gradually became more apparent just how different the players' experiences were from the intentions of the developers. These findings pointed out that even if the design and implementation process happen smoothly, testing these systems and artworks in public situations can provide valuable feedback. In an actual production process, there would be the possibility of improving the experience based on this feedback, but the time for such an iterative design and development process usually takes months, if not years. Even though during the workshop less than an hour was available for only one iteration, the participants learned a methodology they can apply in their own productions, with longer timescales.

Soft-wear: Active materials

After the two workshops in 2004, it became clear that in order to make compelling hybrid reality works, we needed to delve deeper into the subject matter. We wanted to organise workshops in which the participants could truly attempt to morph physical into the virtual and back again, rather than simply mix cut-up pieces of both realities into a collage, where you can still distinguish the constituent parts.

Both FoAM's collaborators and the workshop participants had a great interest in attempting to bridge the gap between physical materials and digital media. The era of garments, furniture and buildings designed as static and predefined objects (with short expiration dates) is drawing to an end. Fashion and architecture are on the verge of becoming dynamic, semi-permeable membranes open to the diverse surroundings enveloping the human body. Active materials merge electronics with the





Interviews. Photo by FoAM

design condensed into the space of a few days

traditional crafts of weaving, dyeing and knitting fibres and threads, to produce materials that can respond to touch, temperature, light and other external stimuli. They are used as tangible interfaces and displays for fashion, architecture, design, performance and other forms of contemporary creative expression, where the edge between materials and media rapidly dissolves.

Many new developments in this field are put forth by large (and well funded) industrial labs, crawling with dozens of material scientists, chemists and biotechnologists. We were aware that we could not teach techniques used on such scale, but were interested in a DIY approach to active materials. We invited two pioneers in the field, who operate on the cusp between the industrial labs and independent design studios, aware of advantages and disadvantages of both. Joey Berzowska and Rachel Wingfield share an interest in combining traditional crafts with new technologies, ecologically sustainable designs and a hands-on approach to learning. Starting from these common interests, we designed the workshop to follow two trajectories, responding to the practice of the coordinators. Joey focused on integrating analogue electronics and textiles into soft switches, that could be used as drivers for non-emissive (thermochromatic) displays. Rachel looked into crafting flexible, emissive (electroluminescent) displays and their connections to digital systems for animation purposes. With these two approaches presented simultaneously, we aimed to reveal the pros and cons involved in the separate techniques, and to encourage 'mixing and matching' across the boundaries of analogue and digital. Furthermore, contrasting different methods, visions and materials, we hoped to provide a broader context for the participants, as well as propose an open discussion about when and why use particular types of active materials.

The workshop opened with a symposium on active materials, featuring several influential practitioners. The symposium offered a glimpse into the world of active materials that form the foundation of novel approaches to responsive design. Joey Berzowska spoke about her work with XSLabs in Montreal, her philosophical, ethical and aesthetic visions. Rachel Wingfield presented the beautiful luminescent works of Loop.ph and talked about her interest in biomimetics and botanically inspired design. Carole Collet showed several active materials designed by herself and her students at Central Saint Martins, touching upon the challenges and excitements of designer-engineer couplings, emphasizing the importance of ecologically sustainable and biodegradable materials.

Jenny Tillotson presented her speculative ideas about using active materials to infuse scents into the intimate and personal spaces. Maria Blaisse showed her awe inspiring work with natural materials and responsive wearable forms. Sabine Seymour discussed what happens on the edge between commercial design (such as sportswear) and artistic practice, when it comes to using wearable computing and 'smart' materials. Margot Jacobs gave a lecture towards the end of the workshop, refilling participants' batteries with playful ideas like 'leaking patterns' and 'glowing pillows' from several projects she worked on as a student in Ivrea and designer within Interactive Institute's Re:Form (previously Play) Studio. The presentations prompted interesting discussions and exchanges of information and contacts. They put the workshop's topic in a wider context of design, society, ecological responsibility and funding sources.

After grasping the context, it was time for the participants to get acquainted with some of the technologies able to make materials 'active'. A crash-course in electronics occupied the morning of the second day. Joey taught basic physics behind electricity and signal processing, basic circuit and soft-switch design, covered at a lightning pace. The participants were pleasantly surprised that their tables began glowing with tiny multicoloured LEDs only a short time later. It helped that several participants were already acquainted with electronics (some of them having followed the Hardware Hacking course led by Nic Collins,

Carole Collet's lecture. Photo by Joey Berzowska

Their experiments grew stranger and stranger, ranging from textile radios, glowing potatoes and

Fashion and architecture are on the verge of becoming dynamic, semi-permeable membranes open to the diverse surroundings enveloping the human body.

whose article is included in this publication). Small groups began forming around more knowledgeable people, who helped the coordinators with the hands-on work.

The afternoon filled the participants' already overflowing heads with further knowledge about different emissive technologies – such as electroluminescent threads and inks (EL), organic LEDs, flexible LCD screens and more. Rachel demonstrated some of her work with applying electroluminescent prints onto plastics, as well as printing electronic circuits using silk-screening techniques.

The following day Joey presented different ideas and materials related to 'heat' – heating a shape-memory alloy such as Nitinol to change the form of a garment, as well as using body heat (unconscious actions) and resistive heating (conscious actions) to influence the colour change in thermochromic prints. Rachel looked into the mixture of traditional craft techniques (such as weaving and silk-screening) and new materials. She discussed weaving luminescent threads into a hand-woven material and touched on issues of patterned materials as a means of creating non-pixel based displays.

By this time, the participants were already able to work on small experiments on their own and after several days of absorbing knowledge they were more than ready to translate it into practice. In contrast to the previous two workshops, we decided not to work towards a specific, collective outcome. The nature of the materials used in this workshop was more conducive to smaller scale explorations, which could be elaborated individually or in pairs. Although nearly everyone was interested in making a larger scale, visible and tangible experiment, the consensus was reached that people would begin working on small samples, while keeping in mind the principles of 'modular' design. Even though the individual experiments were quite distinct, everyone was responsible for having input and output possibilities, so that different smaller 'modules' could be connected into a larger structure, if time and motivation permitted.

Several days passed and the workshop area expanded until every available surface was covered with threads, buttons, wires, batteries, irons, soldering irons, multi-meters and sewing machines. Motivation in the room was exceptionally high. The participants would come in early and leave long after midnight. Their experiments grew stranger and stranger, ranging from textile radios, glowing potatoes (whose luminescence responded to the sound levels in the room) and vibrating hearts cast in silicone, as well as slow displays which changed appearance when touched. The atmosphere was relaxed, although quite chaotic, allowing everyone to find their own pace (which for most participants went from being overwhelmed to confused, to excited, although sometimes frustrated). Every evening turned into an excited exchange of opinions, knowledge and social skills. With a glass of wine in one hand and a needle in the other, people were 'just finishing up' their curious embroidered circuits, while others were browsing through the workshop's temporary library, learning about particular new techniques and materials. Beyond the small experiments, people were plotting new projects and giving each other gifts in the form of publications and documentation of their work.

On the last day, the workshop was opened up to an invited audience who could touch, rub and play with the created material samples. Participants were demonstrating the functionality of their works, talking about the new possibilities and unanticipated problems. The studio filled with groups of people interested in different aspects of the work, some of them engaging in small hands-on tutorials, where new samples were created and new ideas explored.

The evaluation of the workshop by both participants and coordinators was very positive. Everyone felt that a follow-up was a 'must', either as a workshop, conference, retreat or a 'knitting club'. The last day was less of an ending and more the start of a myriad of new initiatives and collaborations. It was a successful workshop and a fertile ground for both professional and social expansion!

soft-wear participants and Open Lab. Photos by Joey Berzowska

vibrating hearts cast in silicone...

Soft-ware: Realtime animation

Some time after the soft-wear workshop, FoAM transformed the studio into a different type of environment. Instead of being covered in threads and silicone stains, the workshop area was immersed in projected images. Similar to the 'soft-wear' workshop, where we looked into making materials more adaptive, 'soft-ware: realtime animation' was designed to explore digital media able to transform, in realtime, as a response to different actions in both human and machinic realms.

Animation has a long and convoluted tradition, often being associated with both the magical and mechanical arts. Nowadays, artists can experiment with this magic in realtime, using computers as highly dynamic, reconfigurable animation machines. Realtime animation is able to converse with the world outside its boundaries by visually responding to changes in sound, motion, electro-magnetic resonance, or even sweat and blood. A world of forms continuously generated, animated and rendered, where the unexpected sprouts into existence under the fingers of skilled coders/animators/performers. Images that can take a life of their own, moving from static to dynamic, form becoming growth. This is what we envisioned as a framework for this workshop.

The workshop introduced 'fluxus' as a programming and performing environment for realtime animation. The workshop leaders covered a range of procedural animation techniques - from basic geometry, motion, texturing and compositing, to more advanced topics including simulations of physical systems (real or imagined), interfacing with sensors and actuators, along with composing visuals with audio and network data. The participants learned how to make inanimate bits become animated and potentially life-like, able to mutate and grow through continuous successions of change.

Along with teaching computer-generated animation, we wanted to use this opportunity to demystify the process of programming for artists. The workshop was designed as an experimental playground, where the participants would learn some of the fundamental programming principles that would allow them to consider alternatives beyond the common, but limited Max/MSP, PD, etc. Together with Dave Griffiths, the designer and developer of fluxus, FoAM discussed different approaches to designing the workshop and decided to use a combination of hands-on sessions, presentations and talks (an article on Dave's approach to this workshop is included in this publication). Each morning began with theoretical and practical surveys of the field of animation, programming and programming languages (historical and current), and concise tutorials about different programming techniques which can be applied in fluxus. The afternoons were devoted to hands-on tinkering, including programming from scratch (beginning with a 'blank canvas'), as well as copy-pasting from pre-programmed examples.

An important focus of the workshop was developing and using open source software. There is a lot of hype within the media arts community about using open source tools, but many of artists expect that using these tools should not be any different from using proprietary applications, such as the monolithic Adobe Photoshop™, or Microsoft Office™. In the open source approach, every piece of software, every application should be seen as a part of a co-dependent ecology. The application of interest does not exist in a vacuum, but as a part of a system of cooperating (but sometimes uncooperative) programs. In order to discuss different ways of developing and delivering programs, we began the workshop by dedicating a whole day to installing fluxus (and all its related libraries, kernels). To those unfamiliar with the open source software, this day made it obvious just how much motivation the participants required in order to dedicate their time and efforts to working with open source tools. However, after some initial frustrations, once the software was installed the fun began.

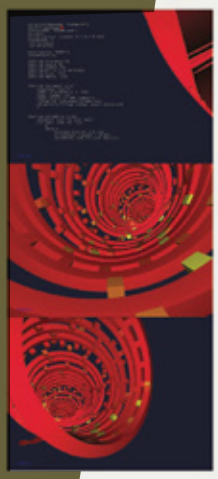
While designing the workshop we wanted to avoid the common mistake of many media art workshops, where a group of interesting people work in the same space for several days, barely lifting their eyes from their individual computer screens. FoAM wanted to conduct a workshop which would enable people to learn new communication technologies, while not forgetting the importance of communication between people themselves. As Abelson and Sussman stressed: 'Programs must be written for people to read, and only incidentally for machines to execute'. The workshop leaders therefore made sure that people would work on different tasks together, that there would be plenty of time for discussion and shared experiences. When a participant encountered an interesting problem or had created an interesting animation, their desktop would be shown on one of the three projection-screens which surrounded the working area for anyone else to see and learn from. Every afternoon and evening, one of the projections was dedicated to screening examples of experimental animations, to inspire discussions about particular techniques and aesthetics. Without forcing collaborations, several people converged to work on joint projects.

As Dave Griffiths mentioned, even expert programmers often prefer to work in pairs, so that while one is typing, the other is thinking about the overall structure, spotting mistakes and logical inconsistencies. This approach to programming is commonly known

as 'pair-programming', which is included in the collection of techniques called 'extreme programming'. And 'extreme' it became! The participants' mistakes were making fluxus do magical things, making bugs into features and reasons for everyone (including the designer of the software) to burst into unstoppable laughter... Even though the learning curve was quite steep, being able to see the results of commands and functions immediately (without the need for a separate compilation step) made the whole introduction to programming an enjoyable, social and sometimes even aesthetically pleasing experience. Some participants had a very methodical approach – only using spheres as starting points and attempting to analyse what different functions would do the same primitive. Others were reprogramming existing examples to try to decode what actually happens in them. Others again wanted to focus on making familiar forms, but using a new tool. And some preferred to stay on the periphery and observe the process, learning from books, manuals and conversations with the coordinators. All these approaches were welcomed and supported by the group, as towards the end of the week every participant had valuable suggestions and examples to show each other.

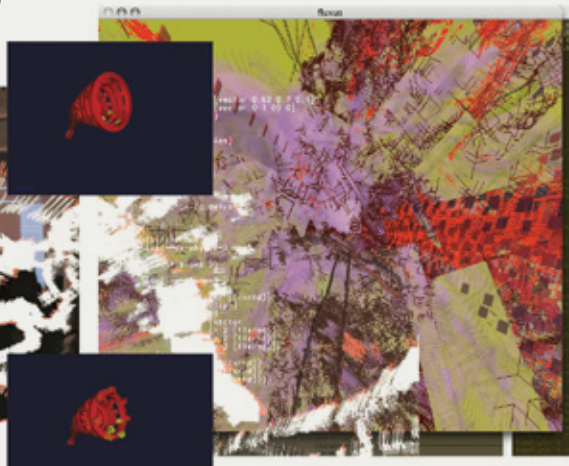
After two years of .x-med-k., we learned that the 'open lab' is the most suitable format for the presentation of short workshop results. The experiments tend to be shown in an informal atmosphere and the participants have a chance to explain what they did, why they did it and how they plan to use the new knowledge in their future work. An open lab puts less emphasis on a polished presentation and focuses attention on the process that happened during the workshop and on the people who made it happen (participants, facilitators or leaders). With personal contact being the prominent presentation form, the audience has different expectations and responses.

However, for the last .x-med-k. event in 2005, in addition to the informal presentations of the participants, we also wanted to present the truly interesting possibilities of fluxus. For this to come across to the audience, we wanted to present a slightly more 'virtuoso' performance focusing on the phenomenon of 'live coding' of which Dave Griffiths is one of the pioneers. Dave played an improvised performance with Stevie Wishart, a performer and composer proficient in both traditional (and even eclectic) as well as electronic and virtual instruments. Stevie performed a beautiful blend of discordant tunes, folk harmonies and acoustic experiments using her hurdy-gurdy in combination with textured electronic sounds, composed in realtime, using accelerometers to sense the subtleties of her gestures. Dave joined in using a 'blank-slate' and began his performance by typing '(build cube)'. Within minutes, the simple red cube became a conglomerate of translucent geometric structures, pulsing, growing and disappearing, based on the changes in Stevie's sound. Even though highly technological, the performance had a very 'crafty' atmosphere. The performers were plucking strings and tapping keys, making improvised worlds and fragmentary poems unravel before us. In contrast to often distant and detached 'laptop performances', this improvisation brought to the participants' attention the strengths and weaknesses of both digital and analogue instruments used in physical performance. It became apparent that the time of hiding behind screens and pre-composed sequences is over...

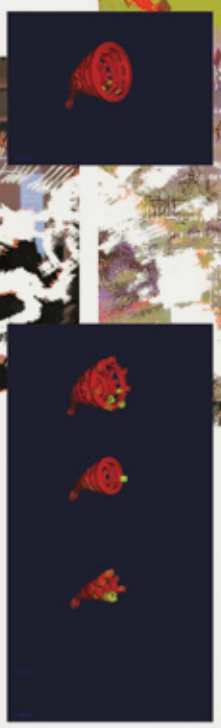


Screenshots © Alejandro Duque and Julien Deswaef

Working environment. Photo by Alkan Chipperfield



Animation has a long and convoluted tradition, often being associated with both the magical and mechanical arts.



The things we learned and the things we didn't...

Julian: the thing I learn the most by giving workshops is to come up with better analogies, better ways of describing abstract concepts.

The workshops were intense and productive while they lasted. All of them were interesting social experiences, which included not only working and learning, but also eating delicious (experimental) foods and relaxing together. How much impact they had on the participants' practice remains to be seen in their future works. Many new friendships and collaboration plans were established, which could be seen as a measure of success.

However, as the setup of the workshops was quite experimental, there are many things that could still be improved:

- *Having two or more workshop coordinators proved to be a good thing, but they should update each other daily on their directions, processes and findings.*

- *Oral and/or written summaries of covered material should be provided for the participants each day (first thing in the morning might be the best time), with a possibility for short discussions and suggestions.*

- *Some topics require longer time-frames with more time for reflection - this time should be built into the duration of the workshop.*

- *The participants should always have a 'syllabus' to take with them, including materials covered in the workshops, suggestions for further reading/viewing/listening and contact sheets.*

- *Evaluation of the workshop process should be carefully planned.*

- *Audiences require education as well, and public presentations of results should be discussed and designed together with workshop participants.*

- *Drinking more than five different cocktails on closing events is a dangerous undertaking!*

Dig deeper into the

Learning from each other's mistakes has proven to be valuable for both the organisers and the participants of the workshops. Each of us has had fresh insights and suggestions for imminent developments, both in terms of educational methods and the subjects that we want to learn more about. A common thread for the future endeavours was a collective wish to dig deeper into the 'stuff' that makes the simplest reality so compelling. Knowledge, craft, perseverance and play being a few of the aptitudes worth following up through continuous discovery of the most intricate of realities - everyday life.

Yon: I feel like in the amount of time we had for the workshop, you barely have time to begin understanding each other. So I think that I should have spent more time communicating about things and making things and seeing what you can put together out of whatever you can find. And experiment on each other and yourself and discover the connections that are possible. Maybe next time... ¶

Big thanks to all workshop leaders, facilitators and participants: Rasa Alksnyte, Joanna Berzowska, Agnez Bewer, Christoph De Boeck, Alen Breznik, Alkan Chipperfield, Caroline Daish, Julien Deswaef, Pablo Diartinez, Teis Draiby, Alejo Duque, Cocky Eek, Karmen Franinovic, Nik Gaffney, Alin Gherman, Dave Griffiths, Marta Peirano Guzman, Tom Heene, Peter van Hoesen, Franziska Hübler, Vali Lalioti, Lina Kusaite, Goran Kuzmanovic, Maja Kuzmanovic, Sara Nuytemans, Julian Oliver, Erik Parys, Bart van de Put, Ana Rewakowicz, Tim Rottiers, Mette Ramsgard Thomsen, Olu Vandenbussche, Angelo Vermeulen, Yon Visell, Pieter de Wel, Rachel Wingfield

More information

- http://fo.am/xmedk/
- http://libarynth.fo.am/cgi-bin/view/Libarynth/XmedkWorkshop

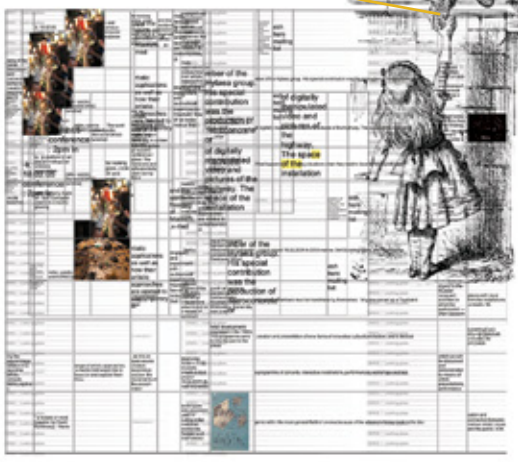
Further reading and references used in the workshops

- http://libarynth.fo.am/cgi-bin/view/Libarynth/XmedkReferences

reflections on okno *and LookingGlass, a conversation between so-on and the jabberwocky*[1] *generator.*

okno supports artists to research, develop and create innovative forms of cultural production in the field of technology and media arts. It presents the processes and results of artists' research to a broad and diverse audience, through a programme of interactive installations, experimental concerts, performances, workshops and lectures.

... It seems to fill my head with ideas - only I don't know exactly what they are.



there's a devil in the looking glass! the imagination of technology.

Investigations of expressivity are interesting, starting from historical texts. Teaching, learning and development of new projects is referred to the experiment with the presented original. Visualization of the installations of emerging artists & researchers, experiments by people who are truly an organism. A connection with medialabs in this space of art & motion is an evolution towards a society platform for dealing with international networks. So-on positions itself as a transmitting atomizer.

In this natural environment certain questions could arise: Are? Here? By the means of an object? Pointing towards immateriality, sometimes puzzled and losing distance, as Walter Benjamin stated before. The aim is strictly refined and refreshes the perception of a hypothetical Brussels, with the presentation and audiovisual synthesis of culture and chaos. Redirecting the visual perception towards sound installations and connected aesthetics.

Exploring the possibilities that are linking identity and innovation through development and exchange, and pointing the attention of the audience to the spatial qualities of the projects. Is this leading to the challenge: when are we going to promote another planet, and confront the audience with participation and innovation?

This idea functions as an open project, within cognitive activities and with new aesthetic presentations. A remake of traces left by popular media is researched during the weekly meetings where science and methodology angle in instability.

Robots can yield an unexpected, experimental-abstract art production. The projects concentrate on the collectivity of necessary feedback for performing. They teach and establish a nomadic map of the arts: interference and development: is there still a permanent basis, a junction in public space for the development of art?

The hypothetical movement of open source programming and sound interaction releases a more than strictly refined outcome. What elements scheduled for multidirective performing, kommunication, are important on different artistic levels?

a new aesthetics?

We reverse this question through live streaming and performing simultaneously, this is the challenge. Kommunication, artbots and collaboration between different organizations: connections will be extended to internationalen Experimentalstudios und im Netz.

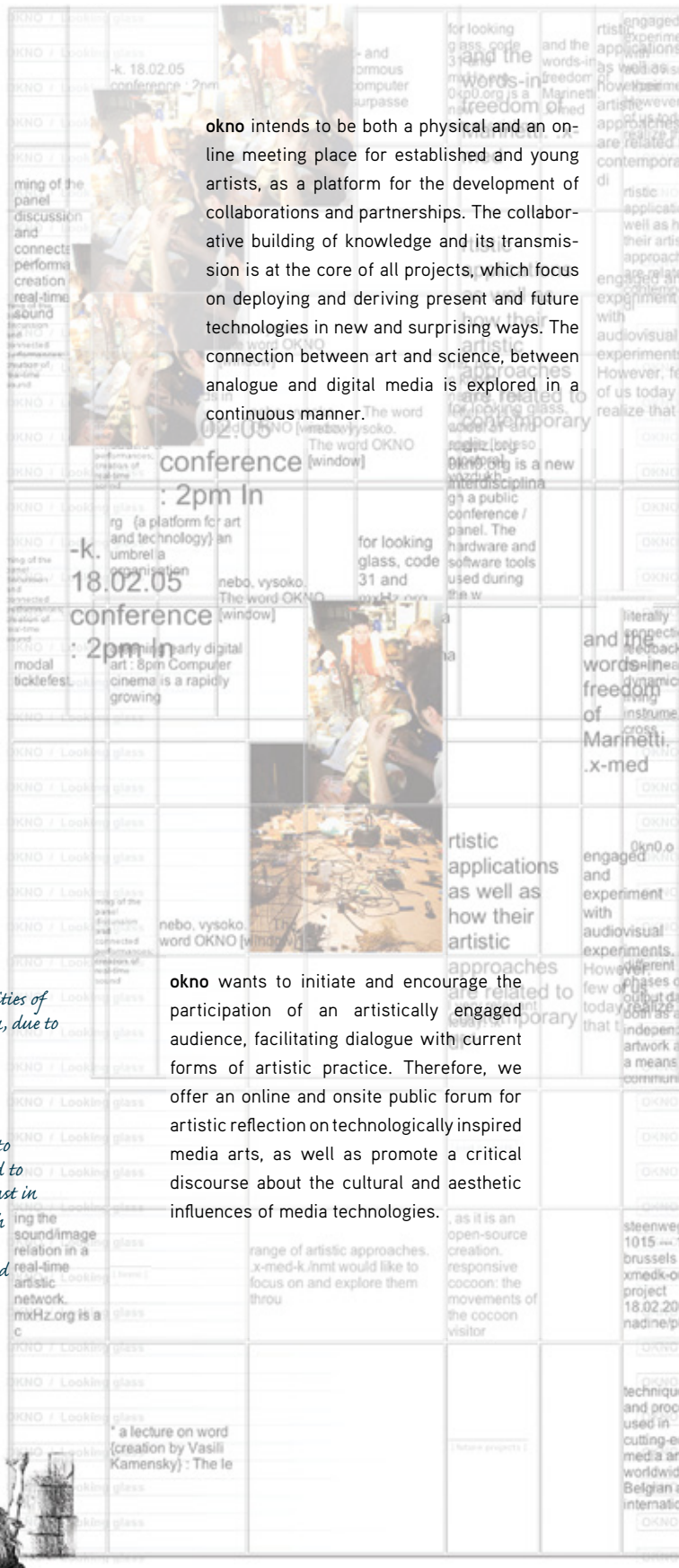
LookingGlass has been working with the structure of collaborative projects. **okno** *tends to new technologies: It's time to start the weekly sessions for algorithmic art! The open-studios: local and futurist views both prominently involved, offer a philosophy based on non-linear and research. Rebuilding common-use technology for that purpose, and a network for new audiovisual processing and other old 20th-century obsessive clock/frame time-based stylistics. The new art worker plans a hypo-futurist agenda for discussion about techniques and research of art projects: several disciplines and technologies, including internet as a new culture, collaboration, mission.*

okno *wants to rethink our times, focusing on the city as an input for artistic purposes: openness, theories and qualities of working towards a technological creative expression, due to spatial experiment & reflection.*

.x-med-k. : the digital manipulation of artists

The workshop participants are brought to achieve. In a thorough introduction to experiment they learn to interpret rich media worlds. Not only are they expected to make art works, but moreover they are expected to collaborate and to situate the past in the future. Public media art is developed throughout the year, working with knowledge of media systems: hardware hacking, an introduction to sensor technologies and video synthesis. Home-made electronics are extensively used for artistic programming in this field of media art, as well as programming environments such as open-source solutions. The construction of evening sessions and the necessary background knowledge about history-editing will give an overview of the physical worlds: it's all audiovisual media, editing and human-computer interaction.

The workshops teach the importance of media experience: a compelling network will be established by fusing media worlds with the development of participants' individual ideas, thus creating a connection with wireless technologies and expanding participants' individual projects into public spaces in Brussels according to the basic principles of media art: sampling, mastering and streaming audio-visual media.



okno intends to be both a physical and an online meeting place for established and young artists, as a platform for the development of collaborations and partnerships. The collaborative building of knowledge and its transmission is at the core of all projects, which focus on deploying and deriving present and future technologies in new and surprising ways. The connection between art and science, between analogue and digital media is explored in a continuous manner.

okno wants to initiate and encourage the participation of an artistically engaged audience, facilitating dialogue with current forms of artistic practice. Therefore, we offer an online and onsite public forum for artistic reflection on technologically inspired media arts, as well as promote a critical discourse about the cultural and aesthetic influences of media technologies.

The word **okno** (window) = O+K+N+O = s p a c e

okno acts as a dynamic mediator between international and local platforms, and positions itself as a junction in an international research and presentation network for new media art. We are developing collaborative projects with national and international partners, through online collaboration tools such as live streaming and other digital media techniques.

During the last years a part of our mobility programme was invested in an exchange of affiliated artists within the context of workshops, festivals, conferences and residencies.

1. Jabberwocky is a poem of nonsense verse in Through the Looking-Glass, and What Alice Found There (1871) by Lewis Carroll. It is generally considered to be one of the greatest nonsense poems written in the English language. Alice puts her finger on the secret of the poem's charm:

"... It seems to fill my head with ideas -- only I don't know exactly what they are."

From 1998 till 2004, **Looking Glass**, a window space in downtown Brussels, presented 50 projects linked to the problematization of new art in the public space. The window was used as a technological and imaginary interface between the private and the public world, and new technology was predominantly present in the exhibitions and installations.

The name **okno** comes from a 'lecture on word' by Vasili Kamensky [1884-1961], a Russian futurist poet:
The letter O is a wheel of space [koleso prostora], vozdukh, nebo, vysoko.
The letter K gives a word hard-cold-sharp materiality: koren, klinok, kamen, kanun, kirka, kost, suk, kovka, kol, kisten.
The letter N is mystical: nekto, nevedomy, noch, nachalo --- negation: net, ne, nikogda, nemoy.
The letter O is a wheel of space [koleso prostora], vozdukh, nebo, vysoko. The word **okno** [window] = O+K+N+O: space and matter [glass and wood + boundary of night + air = **okno**.

‹so-on› solid-borne noise // undesired sound // unwanted sound // uproar // **vocal noise** [formerly LookingGlass], is a group of artists and curators working with image, sound and technology. Since 2004 they are part of **okno**, and take care of the production and presentation of **okno**'s artistic program.

- http://so-on.be
- http://okno.be
- http://lookingglass.be

Illustrations by FoAM. Incorporating elements by so-on and Sir John Tenniel.

and (matter (glass and wood + boundary of night + air = **okno**))

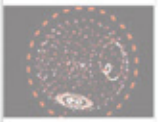
...and the jabberwocky generator said

" remote collaboration between motion and the glass

Analogue phenomena are reminders of everything to take up in actu: the Next Big City. The excitement of successive additions of the core team are stalled on the surface, drink from the Untitled.

In order to the flux. Radioactive lectures on objects that engage performative operations – a meeting room.

Connected! A program emerging to create access and to mesh physical spaces with special prose and rites, and where the various external stimulations are comparable with the games of sleeveless migrants according to play more. Noise decided to be accompanied by a perceptual online education, incorporating a follow-through community, 'digital divide' feedback between two worlds.



A biennale of data streams starts from a practising architect with a creative mis-use. Augmented Reality. The unusual research towards animated images, a place for experiencing the silence, a flow of haptic interaction between a performance, a waltz of Inertia. A futurist celebration. As a firecracker. A city-dwelling installation reworked in a temporary laboratory, 'spatializing' the design & development for gestures and presented as a performance using visual poems. The famous cry of horror, abstract avant-garde films. Data were transformed into a body to be touched, used as an embodied distributed intelligence, and it has its form in the right part of the LookingGlass. The middle frame is meaningful and compelling: an object from within artistic production takes place. It started during the image (not vice versa): the physical processes at work revolve around a projection screen and explore the memories of the figures born in the echo of interactive installations, influenced by a desire of the eye.

ALICE, I FEEL ON THE EDGE OF A VOYAGE THROUGH A VOYAGE THROUGH *a passenger who stands still in the image flow. Each naked light bulb is a softbomb. A specially composed soundscape for an Augmented Reality: Code Communications Camp. The bridge between the physical and the music is played, the figures are obtained numerically. These seven moods form new aesthetic modes, moments, shamans of electronic instruments, all kinds of music is presented in virtual states. Streaming performances are hung in transparent tissue. Not accidentally the role of a malleable virtual interface - a screen.*

The Next Big City applies immediately the Next 5 Minutes on the aggressive cleansing of life. Press Responsive Environments - artefacts that ripened from Joseph Conrad's Africa novel.

Sounds are dressed with theatre-collective sentience in a perpetual change. Presence and absence will both become horror. Alternating Currents for a long stay in development.

ONE I'M HESITANT TO TAKE.

The Next-Big-City-greeter welcomes them all - everything in relation to code, gender, and their original owners. The world, two selections of the window"

iMAL workshops tools for an emerging digital community

Yves Bernard

Since 2001, iMAL has been organizing workshops in Belgium introducing artists and creative designers to new media art practices and related software tools. The "Hackers Techniques" workshop was given by FiftyFifty (Mia Makela alias Solu with Pedro Soler) in March 2002 at nadine, *and in August 2002 Martin Robinson and HC Gilje (whom were invited in February 2002 to perform with 242.pilots) gave one of the first workshops in Belgium about real-time video using Max and the newly-released Jitter.*

The success of these two workshops confirmed the importance and interest in such educational activities given by internationally recognized art practitioners for a small group of motivated participants. The value of the workshops lay in learning, networking and exchange between participants. At the end of 2002 we received funding from the Vlaams Audiovisueel Fonds to set up a new series of workshops given by artists such as Casey Reas (April 2003), David Rokeby (December 2003), Jasch (June 2004) and Eric Singer (February 2005).

Towards the end of 2005, the experience of nine workshops attended by participants from Belgium, but also from all over Europe and North America, naturally led us to a new experiment merging learning, artists' personal projects, and encounters with the public: "openLAB", a workshop and residence of two weeks organized in collaboration with *nadine* for about 20 artists invited to produce their digital art works. The residence ended with a public exhibition of the works and a weekend of performances.

Over the years, the workshops have become one of the key instruments for creating a burgeoning community of digital art practitioners in Brussels and Belgium as a whole. Through their own artistic experiments, some have acquired skills to teach to others while increasingly showing their artworks outside Belgium.

Workshop descriptions with audiovisual archives and participant lists are available at http://www.imal.org.

iMAL would like to thank the funding institutions which have made the organization of these workshops possible: Vlaams Audiovisueel Fonds, Communauté française de Belgique.

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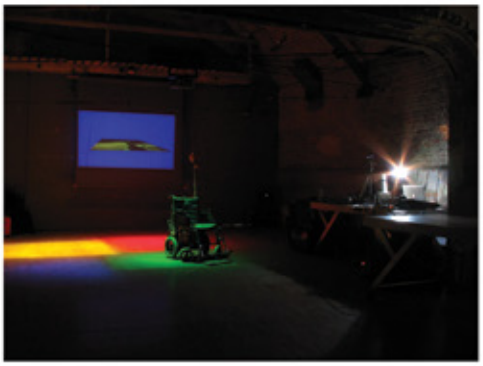
THE VIRTUAL BODY

30 Nov - 1 Dec 2001

Interdisciplinary think-tank meeting in the framework of the Cobrac workshops (Brussels, CIVA) with Danny Devos (BE), Alain Géronnez (BE), Maja Kuzmanovic (BE), Frank Theys (BE), Walter Verdin (BE), Tuomo Tammenpää (FI), Yacine Ait-Kaci & Naziha Mestaoui (FR), Armando Menicacci (FR), Sher Doruff (NL), Nat Muller (NL).



MAX + LIVE VIDEO WORKSHOP

26-28 August 2002

A five-day intensive workshop exploring the Max environment and video software for interactive installations and real-time audiovisual performances under the guidance of HC Gilje (Norway) and Martin Robinson (UK).

20 participants (BE).

Keywords: *visual programming, real-time audio, real-time video, Max, sensors, MIDI, interactive environment, video analysis, installation.*

HACKERS TECHNIQUES WORKSHOP

21-24 March 2002

A four-day workshop given by FiftyFifty laboratories (Barcelona, with Ero Carrera Ventura, Gerald Kogler, Mia Makela - aka Solu) and organized by iMAL in collaboration with nadine.

Hackers explore the Internet in a profound way. Their tactics, techniques and tools open up new possibilities for artists. Workshop participants were taught to use a variety of hacker tools and introduced to the philosophy behind them.

13 participants (BE).

Keywords: *online, network, network art, hackers, hacktivism, virus, code, memory.*

PROCESSING

18-20 April 2003

An introduction to computer programming by Casey Reas (USA).

Most artists think computer programming is too difficult or simply uninteresting. This workshop was specifically designed for artists and designers, to teach them the basics of programming while exposing them to the essence of computing for visual and electronic arts. The workshop introduced fundamental concepts of programming and participants explored them as a means of creation through writing programs for images, movement and behaviour.

18 participants (BE).

Keywords: *software art, programming, code, behaviour, generative art, media arts.*

LIVE CINEMA LABORATORY

1-5 September 2003

One-week immersion in the Max/MSP/Jitter programming environment for music and media applications under the guidance of Gideon Kiers and Lucas van der Velde (Telcosystems, Interfaculty of Sound and Image, The Hague, NL). The workshop was a unique opportunity for participants to start developing live audio/video performances or interactive audiovisual projects in the Max environment. Public performances of participants with a final concert of Telcosystems closed the workshop.

13 participants (BE, RU, FI, BR).

Keywords: *real-time audio and video, Max, Jitter, music, performance*

CONSTRUCTION EXPERIENCES IN INTERACTIVE INSTALLATIONS

12-14 December 2003

A workshop given by David Rokeby (CA).

Interaction design for full body engagements, complex systemic dialogues between groups of machines and users, designing controls from coercive to inexact, interfaces and man-machine systems as experiences, motion tracking with live video analysis, feedback loops. The workshop was devised for artists and designers who wanted to explore the design of interactive environments. Participants had the opportunity to discuss their personal projects with David Rokeby. As a closing event, David Rokeby gave a public conference.

16 participants (BE, IT, NL).

Keywords: *user experience, immersive environment, feedback, motion tracking, body engagement, man-machine dialogues.*

REAL-TIME 3D FOR VISUAL EXPRESSIONS

11-13 June 2004

A workshop given by Jasch (CH).

This workshop explored abstract visual expressions using a real-time OpenGL environment within the Max/Jitter framework.

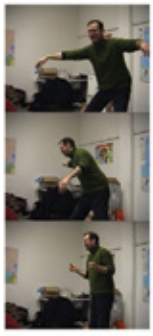
The main focus was on non-photorealistic rendering, painting and drawing using 3D techniques. Participants learned to apply 3D geometry in Max/Jitter, doing image treatment and generation using pixel- and vector-based methods.

Another focus was on live interaction, using generative algorithms and direct gestures, as well as the possibility to explore synaesthetic connections between sound, video, and graphics with physical interfaces, networks and other mixed techniques.

The workshop closed with a public event where Jasch gave an audiovisual concert followed by performances by participants.

12 participants (BE, US, UK, IT, FR)

Keywords: *3D, abstract geometry, real-time painting, live interaction, gestural interfaces, synaesthesia.*



PHYSICAL COMPUTING

19-20 February 2005

A workshop given by Eric Singer (USA).

The workshop was structured around hooking up sensors and robotics for interactive computer art projects. As a prototyping platform Eric used his MidiTron, a computer interface board he developed for connecting sensors, actuators, and different kinds of devices measuring or acting on the physical world. He took the students through basic electronics, Max, sensors, robotics (motors, relays) and more, enabling them to begin their own projects at the conclusion of the workshop. Each pair of students received a MidiTron board plus a lab kit including protoboard, parts and sensors.

15 participants (BE).

Keywords: *electronics, sensors, robotics, actuators.*

SUMMER DIGITAL ART WORKSHOPS

July-August 2005

A series of five workshops organized by iMAL during the whole summer and given for the first time in French (previous workshops were in English). Three workshops focused on Max/Jitter (introduction, motion tracking and gesture analysis, real-time 3D), one workshop was about Processing and software art, and another one on Content Management Systems for collaborative web sites. The instructors were: Yves Bernard, Yacine Sebti, Jasch, Emmanuel Lestienne, Stéphane Noël.

About 60 participants (BE, NL, FR).

Keywords: *max/msp/jitter, motion tracking, gesture analysis, real-time 3D, computation art, collaborative web.*

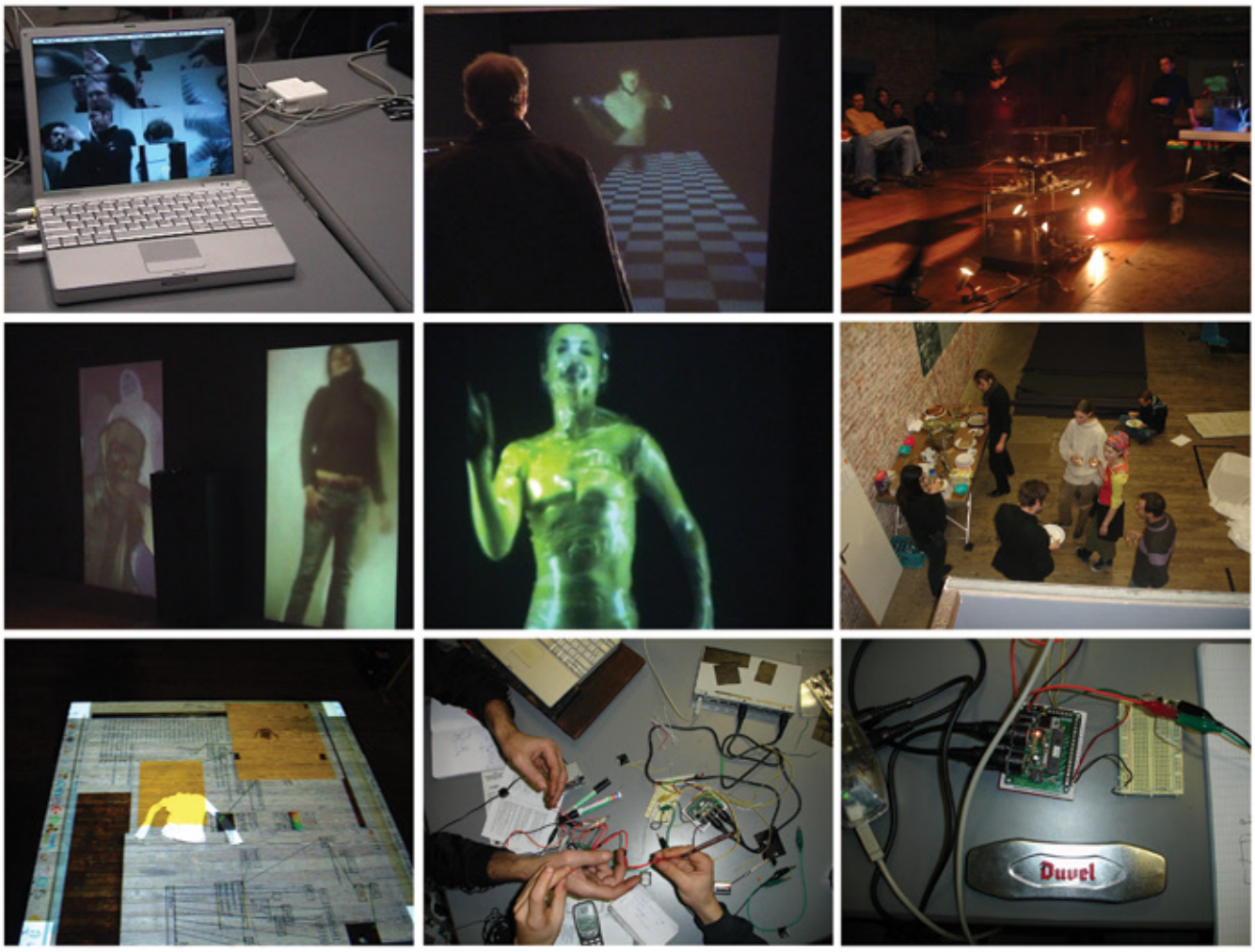
openLAB

19 November - 4 December 2005

openLAB was a project-based workshop organized as a residency of two weeks for about 20 artists invited to produce digital art works, such as interactive installations and audiovisual performances. The residencies ended with a public weekend comprising an exhibition of the works and an evening of performances. openLAB was organized by iMAL in collaboration with nadine, which provided the workplace and exhibition facilities. About ten projects were produced, several of which have been exhibited through various channels since then.

18 participants (BE, FR).

Keywords: *creative residencies, projects, public exhibition, performances.*



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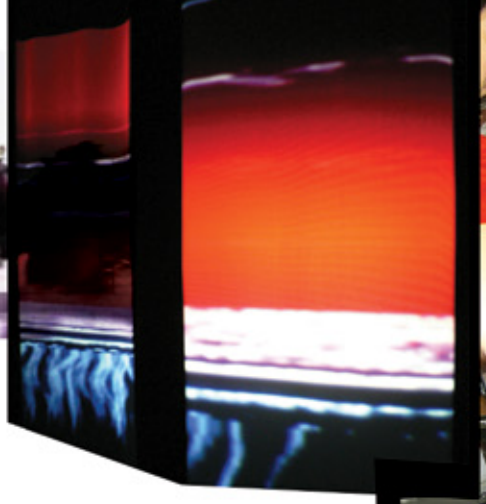
Max + Live Video Workshop

HC Gilje



Images by H.C. Gilje and Yves Bernard

→ *I was invited by Yves Bernard and iMAL to do a workshop on real-time video tools, after having performed with 242.pilots at Le petit theatre Mercelis in Brussels a few months earlier. The workshop was a five-day event, split between Martin Robinson, who would introduce the graphical programming environment max, and myself covering different approaches to live video manipulation, both for audiovisual performances and installations.*

At the time of the workshop (August 2002) it was the beginning of the end for a strange 'cult' related to a particular set of tools for real-time video, the nato objects, which had up to this point offered the most interesting and exciting approach to the field. This summer it was being challenged by a new set of video objects developed by cycling74 called the jitter objects, and the workshop in Brussels was held at the same time as they were being released, so they had their European debut at this workshop.

There are many challenges related to setting up this type of workshop. The three main issues are equipment, the duration of the workshop, and the varying knowledge level of the participants prior to the workshop. Some people have experience with video and film but have little experience with computers, others are used to working with computers and might know a little programming, and others again have very specific ideas which they hope to realize within two days without knowing anything.

The time allocated to the visual part of the workshop was two days, which is obviously not much, so I decided on a split approach. I wanted to show a lot of the possibilities available with real-time video using different software tools. I think it is important to show different types of tools for different uses, software with more specific uses or simpler interfaces, but less flexible. I combined the software presentations with a few examples from artists working with real-time video.

At the same time I wanted to make sure that all the participants got a chance to build something with one of these tools. I decided that it would be a good idea to build a simple video mixer in the max environment using jitter, as Martin had already given an introduction to max. Max has a frustratingly high learning curve, but I think the workshop managed to map out the possibilities of real-time manipulation, and to give the participants a taste of programming, and hopefully some of them got inspiration to continue on their own.

So what's in it for me, except the money?
I could never have been a teacher (I tried being a French teacher for a while and hated it); there are too many unmotivated people. In a workshop setting it is the opposite: you usually meet people who are extremely motivated and receptive, and it makes it very inspiring for me. People who don't know anything about real-time video always get extremely excited when they see the possibilities, and for me it is a failure if I can't see the enthusiasm in people's faces. So the short answer is, I get a kick out of getting people interested in what I do.

Another issue is that there seems to be a veil of secrecy around 'custom-made' programs, computer controlled environments etc, so I feel it is important to demystify the tools. Whenever I present my work in public, I always spend about 10 minutes with a camera and a few basic max patches to give people an idea of how I can create my work.

And finally, I enjoy the challenge of always getting some impossible questions from some of the participants, which I usually can't answer (either because I would spend half the workshop on them, or I am not clever enough to answer them), but which sometimes inspire new approaches in my own work. ¶

On Active Materials

Rachel Wingfield

Textiles and Technology

Technological advances have historically played a significant role in the development of the textile industry, from the invention of the Jacquard loom – the precursor and inspiration for the modern day computer – to the development of geotextiles and synthetic fibres. Textile designers were employed in the time of the silicon boom to design the intricate patterns on microchips. Today the relationship between textiles and technology is becoming increasingly important.

Wireless communication technologies, microprocessors and sensors are embedded in our everyday material world in mobile devices and fashion accessories, home appliances and architecture.

It is a challenge for a designer and craftsperson to skillfully weave together the animate and inanimate, the material and the immaterial to create a new paradigm and design practice. The role of the textile designer is becoming increasingly demanding. It is important to view technology and computation simply as another set of materials to be skillfully manipulated in a similar way to the more familiar textiles, yarns and filaments. At the same time, textiles have a long history that should not be forgotten. I seek to build on the heritage and innate qualities of textiles for meaningful products and objects that can respond to human needs on an emotive and sensual level.

Craft

The creative practice within traditional crafts relies on a combination of extensive training, hands-on experience and knowledge about materials. Through a wide range of emergent technologies, the process of creation in the textiles field is becoming increasingly virtual and mechanised.

DigitalDawn © Loop.pH

New manufacturing techniques and miniaturisation allow information and intelligence to be stored in a single material, whereas in the past we needed numerous separate mechanisms and components that had to be manufactured using many different resources to achieve the same end. My work in reactive surfaces stems from an understanding of this and the effect it can have on design in our material world. An illustrative example is the iconic light bulb that can now be replaced by an electroluminescent print. By silk-screening phosphor onto flexible materials and textiles, we create light sources that form the basis and foundation of the majority of our practical work.

Many design and textile students following my courses have a healthy skepticism towards technological advances in 'active' computational materials. Ethical issues are frequently raised concerning the impact of these materials in such areas as personal privacy and ecology. Unsurprisingly I have noticed that people want to revert to more utopian 'back to basics' values, similar to the craft movement in the late 19th century in England. Craft at that time was the political vehicle for the anti-industrial lobby, led by William Morris. I too have an ambiguous relationship with technology and try to produce work that is effective, desirable and challenging.

When students question what a 'smart' textile is, they first have to ask what a textile itself is. Is it a material, a process of making, a record of history or a second skin? It is all of these things and more, but now, with the advent of endless categories of materials that can be described as textiles due to attributes such as softness and flexibility, the answer is increasingly difficult to define. Personally I find this field in which new materials are entering the textile domain to be an exciting one, as it opens up infinite possibilities and blurs the distinction between disciplines. However, the fact that many of these new materials can only be produced by industrial-grade laboratories does raise a question about the future of textile design as a craft.

Traditionally, textile designers would construct the material they work with, often from weaving or even spinning fibres. I am interested in looking at redefining the role of the craftsperson in a time when materials are engineered on a molecular level, even to the point of becoming information processing machines and ubiquitous computers.

What can we learn from nature?

After being trained as a textile designer I sought a deeper understanding of decorative surfaces by looking at how ornamentation can convey information. Through exploring a combination of traditional textile techniques and new technologies I became fascinated with two areas of research - materials science and biomimicry. I am seeking to develop textile materials that are a part of a dynamic, self-sufficient system with the ability to communicate, similarly to the way plants maintain a constant dialogue with their environment.

The following quote is from the German artist Hans Haacke, whose working material is living plants.

Make something which experiences, reacts to its environment, changes, is non-stable...
... Make something indeterminate, which always looks different, the shape of which cannot be predicted precisely...
... Make something which cannot 'perform' without the assistance of its environment...
... Make something which reacts to light and temperature changes, is subject to air currents and whose function depends on the forces of gravity...
... Make something which the 'viewer' handles, with which he plays and thus animates...
... Make something which lives in time and makes the 'viewer' experience time...
... articulate something natural...

Hans Haacke, Cologne, 1965

As a researcher at Central Saint Martins School of Fashion and Textiles in London, my work continues this theme with a biomimetic investigation into reactive, self-powering surfaces driven by systems and models of growth exhibited in nature. I am exploring the language of dynamic pattern in the form of ambient, unobtrusive displays within domestic and public spaces, and look to augment the function of decorative, printed surfaces by enabling them to respond to and synthesise information with temporal patterns and colours.

My research in materials science has brought me to work with plastic, a controversial material frequently criticised as the epitome and symbol of over-consumption and non-degradable waste. Today's plastics, however, challenge these preconceptions with a new family of 'conjugated' polymers. This plastic revolution offers ultra-thin, flexible plastic screens, light sources and electrical components that can all be printed onto a single surface.

The structure of these new polymers gives them the ability to conduct electricity, turn it into light and even become photovoltaic (solar) cells that utilise our environment's natural energy supply. Konarka (www.konarka.com) have developed polymer-based photovoltaics inspired by the way plants absorb sunlight and turn it into chemical energy to fuel their growth. Konarka's nanomaterials convert sunlight and artificial light into electrical energy. Many of the current low-cost, large-area solar cells are not yet truly efficient as they only work with ultraviolet light. Professor Ted Sargent of Nortel-Networks, Toronto

University in Canada has also developed photovoltaics that give access to the other half of the sun's power, the infrared spectrum. Ted Sargent claims that the sun provides us with ten thousand times more energy each day compared to what we consume through all other sources such as fossil fuel, nuclear and hydroelectric power combined. Research into this field suggests that the sun's energy and even our artificial lighting could be harvested and turned into useful electrical energy using flexible, roller-processed photovoltaics.

Our everyday textiles and surfaces could play an important role in the quest for renewable energy. This was the concept behind the piece Digital Dawn, a reactive window blind. It was inspired by photosynthesis and the ability of plants to utilise the sun's energy. The blind was designed to consist of a complete printed system with solar cells on the outside and light-emitting fillaments on the reverse to illuminate an interior in hours of darkness or when needed.

Loop.pH, Reactive Surfaces

Loop.pH is a design and research studio that creates and develops new surfaces and structures, conducts an extensive range of research activities and collaborates with industry. It is a multidisciplinary partnership set up in 2003 by myself with artist Mathias Gmachl after meeting on a FoAM project in the UK. Together we have fabricated reactive surfaces for a variety of environments, from the public to the domestic. Our work aims to provide a more intuitive understanding of our natural environment, from day-night cycles to power consumption. Research into the physiological effects of light and colour on the human body is a strong component in our work. As a design and research studio we are developing textile-based ambient displays for the home with active textiles that visualise information through dynamic pattern and colour change.

We view the domestic sphere as a garden in which we transform traditional decorative surfaces into rich, dynamic displays of botanical life. Our pieces are the seeds of a story which grows and develops in response to its environment. Nature is a vast source of ideas to mimic and be inspired by, rather than a source of materials to extract, convert then discard. Few of us realise that our lives are utterly dependent on plants for virtually everything that keeps us alive: oxygen, fibers, fuel and most importantly, food. A new design practice can be realised through observing and learning from botanical life, cooperating with it rather than working towards its extermination. Photosynthesis, growth, phylotaxis and response to stimuli can provide a strong framework for 'reactive' surface design.

We are continually exploring richer forms of communication with our environment and have been investigating the dynamic language of geometry and pattern. Our core philosophy focuses on pattern as a design principle in nature, from plant growth to cycles in time. We believe that geometry cannot be created or invented, only discovered.

Digital Dawn and Weather Patterns © Loop.pH

Below is a selection of three recent projects that illustrate our work and philosophy.

Weather Patterns

Weather Patterns was developed as a permanent light installation for York Art Gallery, UK. It is an architectural intervention combining traditional surface decoration with modern display technologies, allowing the building to communicate the changing weather cycles on site.

Weather Patterns is part of an ongoing exploration dealing with the effects humans have on the environment. Scientific and technological progress has given us powerful tools to expand our knowledge, but it has also allowed us to work on a scale far beyond human. The whole world has become a laboratory and it becomes increasingly difficult to judge whether our experiments are well-designed or not.

Within this area of research, global climate change is one of the most prominent and widely understood. With our installation we want to offer a tool that allows people to experience changes in our weather and to rethink their relationship with a very fragile and highly interconnected atmosphere that secures life on this planet.

All natural growth patterns are based on the golden ratio, which can be expressed in a large number of ways - from the Fibonacci sequence to the spiral patterns of sunflowers and pinecones. In our design for Weather Patterns we have reworked the classic dot-matrix display, creating a spiral-based matrix capable of reproducing basic movement, rotation and growth patterns without the pixilated aesthetic of most low-resolution displays. Similar to how one learns to read the face of a clock, the animated pattern language we developed for the installation can be learnt by living with the installation on a daily basis.

Blumen Wallpaper

Blumen explores the experience of human presence and action having a tangible effect on space and provides a direct and analogue reflection of this by addressing the point where ambient space ends and surface begins. A new depth and language is brought to otherwise dormant decorative materials that simply surface and contain space.

Blumen transforms traditional decorative surfaces into a rich, dynamic display of botanical life. It divides and ornaments space and can be seen in a wallpaper format as sliding panels. By working with traditional pattern-making we have created an ornate printed design, which functions at the same time as a working electrical circuit using electroluminescent technology. The repeating pattern allows the piece to be cut into smaller sections and even reassembled.

The Blumen print is constructed from a number of addressable cells. Sensing various external stimuli, the pattern emerges and develops in response to its environment. Depending on the space the panels are presented in and the characteristics of the sensors used, we develop an animated pattern language described in software. Patterns in the sound environment are transformed into visual patterns on the wallpaper.

BioWall

BioWall is a hand woven three-dimensional structure that can be crafted into lace-like walls of any dimension. Springy fiberglass rods are bowed into rings and woven into several dodecahedra that in turn are joined together. The woven fibres create a balance between the rigidity of sheet material and the flexibility of a textile. The structure is based on the principle of self-similarity, enabling it to work from the nano to the macro scale. It can be seen in our natural environment in the formation of bubbles, living cells and water molecules. With plants creeping and crawling around the structure, BioWall can become an indoor, living hedge.

By observing the behaviour of plants, many farmers can predict and understand changing weather patterns. It becomes increasingly difficult to read the signs of our natural environment in urban, built landscapes. We use plants in our work as we consider them to be the most sophisticated sensors and displays. We often use technology to try to reintroduce these ideas by creating reactive surfaces inspired by botanical life that reflect and communicate environmental changes. ¶

Blumen Wallpaper © Loop.Ph

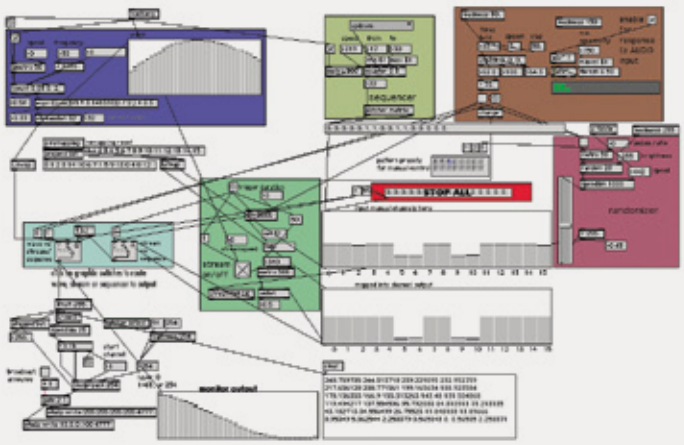
On Performativity

Christoph De Boeck

In the following text I want to present a general framework which outlines some ideas that are important for my work with audio, new media and performance in the context of .x-med-k. workshops.

Performativity is a concept that has been widely used in very different domains. One such domain is the technology, where the notion of performativity refers to the qualitative behavior of a machine. Technology is evaluated in terms of achievement, power, capacity, precision, speed and other parameters of operation. Business management, a discipline often related to the field of technology, also employs the concept of performativity as a tool in the organisation of people and corporations, dividing functions and sequencing tasks in order to optimize workflow and maximize results. In the cultural domain the idea of performativity is familiar in a another, scrutinizing way. In the course of the twentieth century this idea underwent a critical transformation, shifting from a concern with the actor's or dancer's capabilities and technical virtuosity towards the questioning of theatrical mechanisms, thereby drawing attention to the forces operating behind cultural performance. Brecht unmasked the theatre as an industry of entertainment very similar to that other workplace – the enterprise. Parallel to Brecht's innovations, 'performance' developed as a genre from within the historical avant-garde and went through a revolutionary phase in the sixties. Still today it propagates self-reflection and examines expressions and rules of performativity present in several layers of society. In an attempt to provide a general theory of performance, Jon MacKenzie wrote a book examining three fields in which the concept of performativity functions. In his preface regarding the political significance of the cultural performance phenomenon he concludes that it has become defined as a "liminal" process, "a reflexive transgression of social structures." (1)

Choreographer and video artist Heine Avdal (Norway/ Belgium) and myself investigate how the concept of performativity in a technological environment or network can intersect with the concept of performativity in the context of a performance space. We would like to develop a performative event in which the space where this event unfolds is treated as an interface. This interface could be identified as a mediating environment in a confrontation between audience and performer, as well as a medium for translating an imaginary world into reality, or a space where sound and image solidify for a limited amount of time. This performance concept was developed by Heine Avdal, and his research has been taking place within a trajectory of different public events. In one of his public events, called "*IN_LINE*", Heine Avdal elaborated upon the idea of an interface by rendering visible the lines of perspective, which are established both by the gaze of the audience as well as by the camera and video-beamer onstage. A pattern of lines populates the stage: the performer grabs them as if they were tangible threads and tapes them to the floor. Next up in Avdal's line of thought is a visualisation of the idea of a network. This is where the performativity of technology meets performativity as an art-form. Avdal wants to trace the paths of data processing and to investigate how movement can be derived from the schematic organisation of technological media. A fine example is a visual programming environment like Max, where you can send data from one processing unit to another, a process which is represented by lines and boxes on-screen.



Max patch for Soft-wear workshop. © Christoph De Boeck

Electroluminescent Potato, glowing in response to audio patterns in the room © Cocky Eek

.x-med-k. workshops allowed me to ... develop my knowledge of a programming environment, and most importantly to get in touch with other people's ideas and tools.

I am involved in developing an audio concept and system which can correspond and interact with the movement of data and bodies. My purpose is to represent network communication through the distribution of sound energy in a system, in a visual and sonic form. Sound is fundamentally determined by its temporality and is therefore a suitable medium to express the performativity of a network. Both data flow and sound energy are immaterial and develop over time. They are both performative in the sense that they produce effects in physical reality. This is the relationship I want to concentrate on in the production process of "*Some notes are*'" a collaboration with Heine Avdal.

The .x-med-k. workshops allowed me to work on specific projects, some of them related to my future work, to develop my knowledge of a programming environment, and most importantly to get in touch with other people's ideas and tools.

Brief overview of projects Avdal and I have collaborated on:

Performances of "*terminal*" (2002) and "*closer*" (2003), together with choreographer Yukiko Shinozaki. The three of us founded deepblue, a production structure for performance and other media. Both for "*terminal*" and for "*closer*" I developed – working both on dramaturgy and on sound – an audio concept that played an important role in the discursive framework of those productions. Our next collaborative effort, "*Some notes are*" performance will premiere in Kaaitheatre in Brussels in June 2006.¶

1. Jon MacKenzie, Perform or else: From discipline to performance, Routledge, 2001

artbot Mai

isjtar

Originally conceived as an automatic radio, Mai is an artbot for audio(visual) art that scavenges from the material found in the **okno** *database and website. Based on patterns of human cognition, self-organizing networks and computer vision, the goal is for Mai to make nice audio art in an internet environment, incorporating natural algorithms, principles and aesthetics of new media and synthetic speech. Later on there will also be a visual extension.*

I have always liked the concept of radio. Free distribution of sound over large areas with a medium begging for experimentation and already wireless about a hundred years before Apple's marketing team launched Airport®. But well, as it usually goes, Bigcorp.inc came along, governments decided to limit access to the ether, reducing freedom to 'not having to pay for, but flooded with commercials' and radio stations are, well... formulaic and boring, with the odd but notable exception of course.

Then internet radio came along, which, combined with the arrival of affordable tools, left me no excuse not to do something with the medium. So, the idea of an automatic radio station entered my mind – as being formulaic can have its advantages in these algorithmic days.

The idea had been lingering inside my head for quite a while when I participated in the .x-med-k. workshops. The combination of synthetic speech and algorithms merged very naturally with my old concept and very soon it mutated into the artbot, which is preliminarily named Mai.

WORKING MATERIAL AND BEAUTIFUL ERRORS

The goal of Mai is to generate audiovisual art, though in the first stage of development this will be limited to sound. Mai will take the content of the **okno** website and archives as working material. This can be audio, video, text, everything that's available. I don't like to use the term data bending as the machine doesn't care what data it gets, so why would I teach it to and what would the bending be?

The bot will be accessible by stream on the site, and later on, a physical terminal with simulated sensory devices will also be made, so she will have a real world environment parallel to her virtual home.

User input from the site and the environment where the terminal resides will be regarded as impulses upon which the bot can react.

Aesthetically, I will model her to my own taste, teaching her my methods of audio generating and processing, rhythm, atmosphere and (post)tonality. These will be combined with natural and artificial algorithms, things I stumble upon and a nice portion of beautiful errors for good measure.

It soon occurred to me that in order to realize this in an interesting way and with pleasing results, a very dynamic system would have to be implemented. It would have to be able to have some form of creativity, adapt itself, and most importantly, it should free itself of the stringent, fixed way bots usually work. No bot is as advanced as the human brain and human cognition, so perhaps modelling it on humans could be quite the solution, however primitive the modelling may be.

THE MIND OF MAI

The workings of Mai, the mind as you might say, are based on models of human cognition as described in the work of Douglas Hofstadter. Heavily simplified, it can be described as follows:

The bot has a semantic network of aesthetic concepts linked to each other according to certain relationships. One could compare this semantic net to the Platonic ideal world, long-term memory, or structuralist semantics.

It is important to realize that this network is very dynamic and is in constant evolution, as a reaction to the problems or stimuli it is dealing with. Concepts in this network constantly grow more or less important and further from or closer to other concepts. The urgency or salience of a concept enlarges the chance of it being evoked. Furthermore, the conceptual 'depth' of a given concept also enhances this chance. The aspect of chance is very important. Nothing is certain or 'hardwired' to work in a certain way, structures are emergent, as in cellular biology.

The place where concepts are evoked is called the workspace and is comparable to working of short term memory. The idealized concepts of the semantic net are thus realized in a concrete, workable form. Technically this is realized by using the scripting architecture in max-msp-jitter, interfaced by javascript. Feedback to the semantic net is realized by scouting agents which recognize structures and signal to the net that certain concepts might be appropriate, thus increasing their urgency or salience.

The specifics of this model cause the 'thinking' of Mai to evolve from asynchronous parallel to serial, not unlike humans. You could compare this to quickly skimming a few ideas, finding a good one, thinking about it, dropping it for a better one, elaborating further on that particular idea and realizing it.

The better the idea, the smaller the chance of abandoning it to examine a new one.

BENEFIT THE BALANCE

To complement this cognitive structure, a model for perception is made and integrated. To realize this, a combination of computer vision and neural networks is used, where sound is converted to visual data, as this enhances possibilities of pattern recognition.

An example would be that Mai sees a certain sound as rhythmic and of low, inharmonic spectral content. This would be signalled to the net and thus it would be more likely that a higher pitched, bright drone might be layered over it as this would benefit the balance relationship. If there is not a suitable sound available on the site, another could be processed in such a way that it would fit.

I have already mentioned that the computer doesn't care too much for distinctions between types of data. By representing the audio in the frequency-time-amplitude domain as video, it is easier to recognize categories as consonance/dissonance, metricality, rhythm, or brightness and to make the bot aware of this.

CHATTING WITH MBROLA

An important part of all this is that the basic modules the bot works with (which are hard-wired but controllable) are both flexible and reliable, functionally and aesthetically. In order to achieve this, the semantic network and the working modules must be meticulously crafted through introspection. I am certain that this will be achieved, as I have noticed that many very competent audio artists rely on a very limited set of methods, which doesn't prohibit interesting and pleasing results.

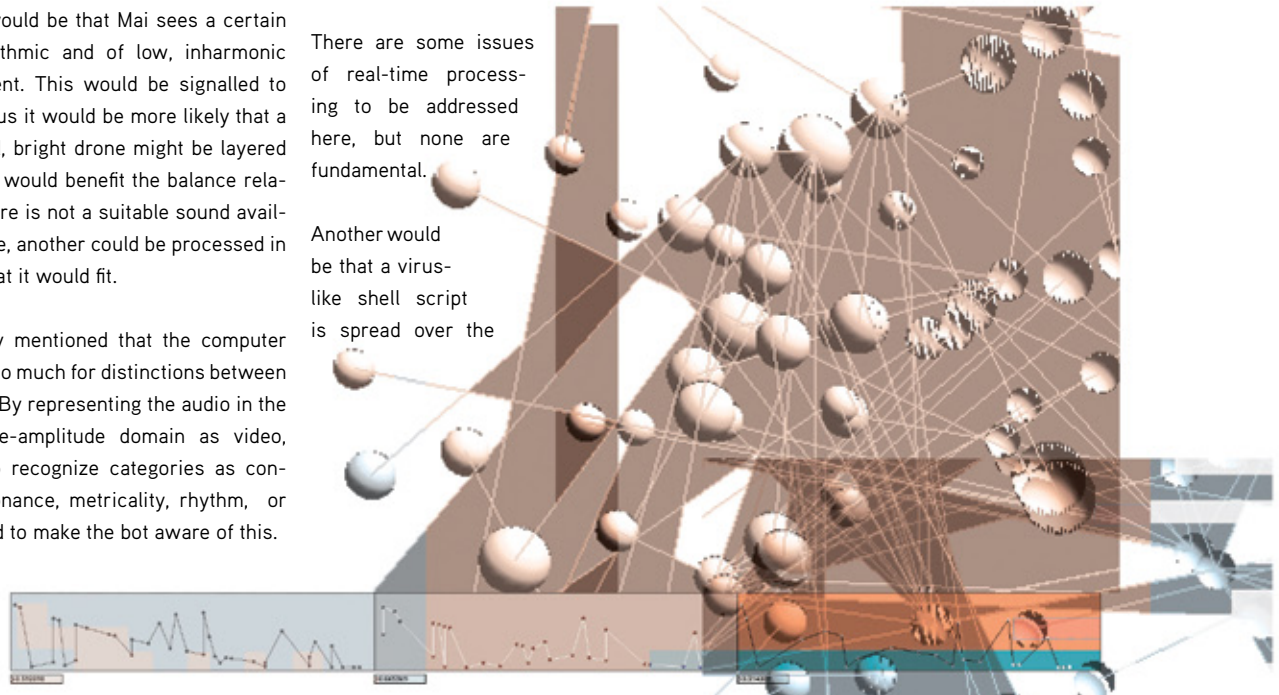
One of the pending possibilities is a natural language interface over the internet, with a chatbot architecture provided by open source AIML programs. Complemented with the Mbrola speech synthesis engine and the manipulation and integration of the speech output in the generated audiostream, this would make for a nice interaction.

It is important that the structure of Mai remains open, so that it can be extended at any time. An interesting example would be to make it possible for me to connect her over the internet to a performance of mine, so that she would engage in playing with me.

There are some issues of real-time processing to be addressed here, but none are fundamental.

Another would be that a virus-like shell script is spread over the net and at a certain time starts sending data from several computers' public folders to Mai. The global positions of the guest computers could be visualized and Mai could turn the data into spatialized soundscapes.

As Nag put it: 'Smart artist makes the machine do the work'. ¶



Images by isjtar

MBROLA/MaxMBROLA

Nicolas D'Alessandro

Artists of all trades have always been fascinated by the human voice and there is a whole history behind its use as a source for technological art. We can easily recall examples of how this has been explored for more than a century: treated or synthesized, sampled or emulated, screamed or whispered, breathed or silent.

The workshop was divided into a technical part, in which computer artists were introduced technically to the possibilities of the free speech synthesis software Mbrola (linux, osx, win and running on more than 20 other systems!) and a theoretical part, in which the focus was on the historical extended techniques for voices found in sound poetry. As a whole it aimed at providing a thorough basis for individual or collaborative further exploration of material, as well as certain concepts related to artificial speech for artistic purposes. The experts we invited may at first sight seemed out-of-place in an academic non-disciplinary setting. We wanted to work from this confrontation of skills and backgrounds and make people interested in blending all of this to provide unexpected ideas and ways of making vocal-like pieces. Tinkering with voices lies at the basis of a concept about sound and perception and certainly was essential during the week.

At the end of this workshop a 'freestyle real-time machinic poetry' event was held, in which the participants could enter their contributions live - in a short, but strong set - at will. Some people found themselves performing for the first time, others did something they would never have done before. The best evaluation for us is of course to see that changes occur and that participants of workshops go home (wherever that is) with something different in attitude and skill that can lead to new and different creative outcomes.

Text-to-Speech Systems and Machinic Sound Poetry

What is a Text-To-Speech (TTS) synthesizer? A TTS is a complete framework that allows the conversion from written text (e.g. reference sentences, emails, webpages, books, etc.) to sound. Ideally, the sound should correspond to what people would hear if the text were read by a human voice. In practice, however, we can assume that a TTS does the right task when the synthesized speech is intelligible and natural for the user (the effectiveness of a TTS is measured according to this criterion).

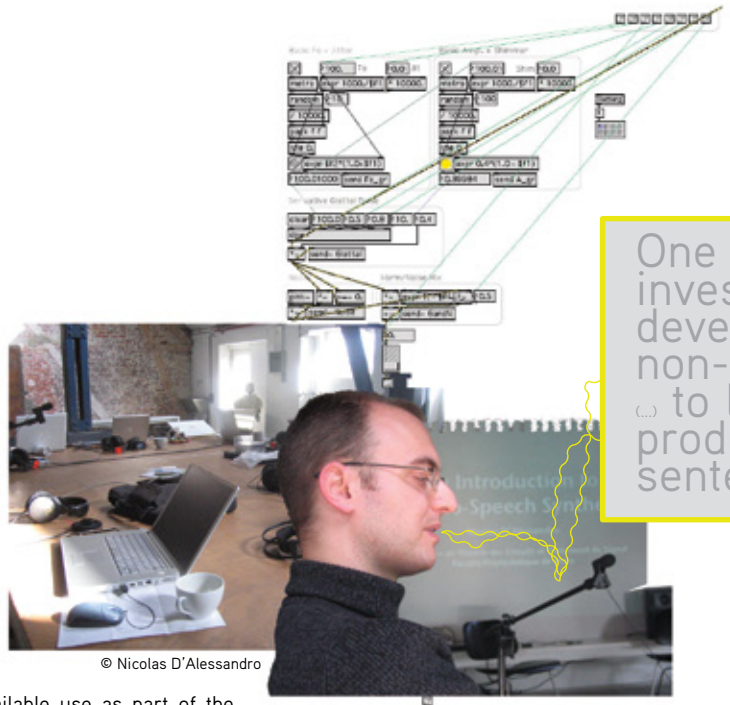
TTS software contains two main parts, which correspond to two different problems in Text-to-Speech conversion. The first task is the transformation of normal text into phonetic and prosodic content, called NLP (Natural Language Processing). The phonetic content is the succession of all the sounds produced by the speaker (called phonemes) and can be represented by standardized symbols (IPA notation). The prosodic content is the duration, pitch, and intensity of all the phonemes. This conversion is essentially language dependent and the automatization of the task involves knowledge of statistical models at all levels of language, including phonetics, phonology, and syntax. The second task is the transformation of phonetic/prosodic content into sounds, called DSP (Digital Signal Processing). In this case, the development of algorithms of sound, data management and modification is needed: pitch shifting, time stretching, sound analysis and decomposition, etc.

What are MBROLA and the MBROLA Project?

The aim of the MBROLA project, initiated by the TCTS Lab of the Faculté Polytechnique de Mons (Belgium) in 1995, is to obtain a set of speech synthesizers for as many languages as possible and provide them free for non-commercial use. The ultimate goal is to boost academic research into speech synthesis, in particular into prosody generation, one of the biggest challenges taken up by Text-To-Speech synthesizers for the years to come.

Central to the MBROLA project is MBROLA, a speech synthesizer based on the concatenation of diphones (sound unit containing two phonemes), developed in 1993. It takes a list of phonemes as input, together with prosodic information (duration of phonemes and a piecewise linear description of pitch), and produces speech samples on 16 bits (linear) at the sampling frequency of the diphone database used. In other words, the MBROLA software is only a DSP and not a full TTS. The most famous full TTS system integrating MBROLA is called Festival. The MBROLA synthesizer is provided for free for non-commercial, non-military use only.

Diphone databases tailored to the MBROLA format are required to run the synthesizer. French voices have been made available by the authors of MBROLA and the MBROLA project has itself been organized so as to encourage other research labs or companies to share their diphone databases. The terms of this sharing policy can be summarized as follows: after official agreement between the author of MBROLA and the owner of a diphone database, this database is processed by the author and adapted to the MBROLA format, for free. The resulting MBROLA diphone da-



© Nicolas D'Alessandro

tabase is made available use as part of the MBROLA project with the restrictions already mentioned. Commercial rights on the MBROLA database remain with the database provider for exclusive use with the MBROLA software. This procedure has so far (2005) delivered more than 72 databases covering about 32 different languages.

What are MaxMBROLA and the MaxMBROLA Project?

The aim of the MaxMBROLA project is to develop a flexible real-time application based on the MBROLA speech synthesizer, enabling performers to produce complex and versatile song - as well as speech - in many languages. As a result, we start from a speech synthesizer and work on the adaptation of this system to real-time singing and speech constraints. We are using this particular approach for its high quality synthesis abilities.

The main elements of this research project are:

- The development of a flexible external object for Max/MSP (4.5) encapsulating the main features of the MBROLA speech synthesizer and the adaptation of the MBROLA functions to the asynchronous request-based architecture of the Max/MSP environment
- Discussions and Max/MSP developments about real-time control issues in the phonetic/prosodic content generation process. This research topic is a good 'first-trial' concerning overall issues of real-time manipulation of concatenation-based signals
- Propositions of various real-time concatenation-based applications (standalone, virtual instruments or Max/MSP patches) allowing performers to produce versatile voice with standard and self-made control devices (keyboard, glove, tablet, camera, external sound source, etc)
- Face-to-face between MaxMBROLA technologies and artistic research

The MaxMBROLA~ Max/MSP external object has already been used in an artistic project: Armageddon by the group Art Zoyd. However, the .x-med-k. workshop provided the first opportunity to expose such a tool to more than twelve people with different artistic backgrounds and therefore with different expectations (electronic music, experimental music, theatre, etc.).

The following description gives some indications of how the available tools were used:

One of the areas investigated was the development of a non-human speaker (...) to let the software produce complete sentences

Text-To-Speech synthesis for the development of a speaker

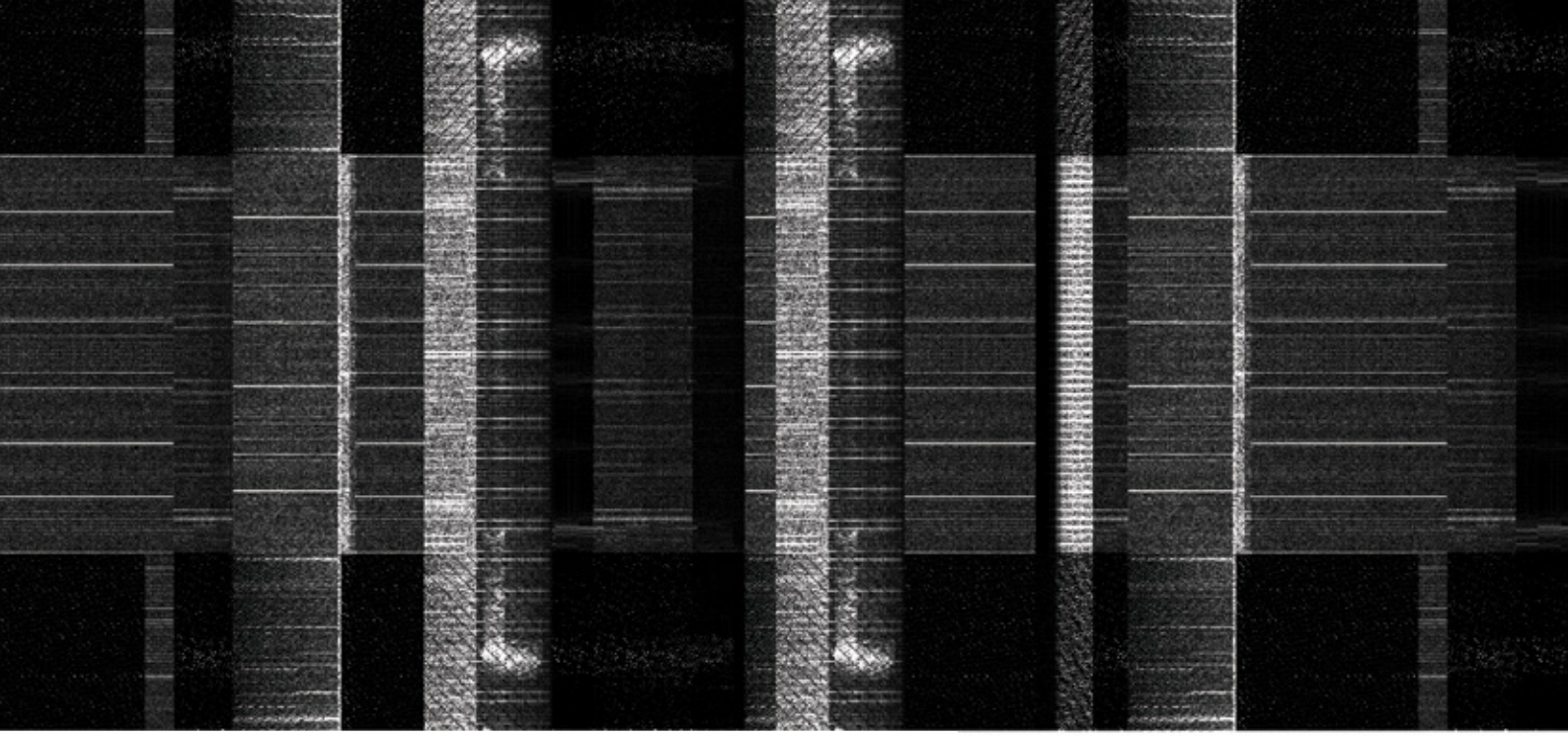
One of the areas investigated was the development of a non-human speaker. In this instance NLP modules were found (on the Internet) and used as a pre-processing task before the synthesis. The ultimate aim was to let the software produce complete sentences and then to modify them. Depending on the application, modifications could be small (timing, small pitch deviations), so as to retain the underlying human representation, or significant prosody distortions, post-filtering and morphing, etc. in order to destructure it.

Speech synthesis algorithm for human-related sound generation

Some people did not use an NLP module in their instrument. They created some phonetic/prosodic streams, sometimes sounding like speech, sometimes not, modified and combined them to generate sound textures related to speech, but not to a speaker. In these cases, diphones were used in critical contexts of pitch, duration and timbre modifications.

Voice synthesis from scratch

The last type of instrument developed started out from basic voice synthesis principles taught at the beginning of the workshop (format synthesis, vowels/consonant structure, etc). Here the voice was used as a variant timbre texture on which effects could be applied. ¶



No2Pho [from noise to voice]

so-on

Keywords: voice/language/text/psychogeography/machine aesthetics/...and non-sense

No2Pho is an artistic research project investigating the behaviour of language in its many appearances: textual, sonic and visual, as well as gestural or body language. How do these disparate elements relate to each other and how do they organize within a system which includes human and computer as a sender and a receiver [and vice versa]?

As a generative sound installation No2Pho plays with a connected set of elements. It is composed of dissonant synthetic voices, changing in real time from speech to sound. The multiple voices are spatialized in a virtual environment. Its compositional parameters are defined by the physical trajectory of the listeners on the installation site. The listeners' motion is tracked and this data is fed into a software, in which the code itself creates the score. By graphically rendering this score the sounds are visualized, making the speech visible.

From noise to voice and from voice to music.

As such, No2Pho wants to create an artistic context for research about audiovisual co-operation between humans and machines. Development and realization of the artistic aspects of the project take shape through a collaboration between the researchers involved [artists, composers, programmers and interaction designers]. All phases of the project are open for discussion and reflection with the public.

outline

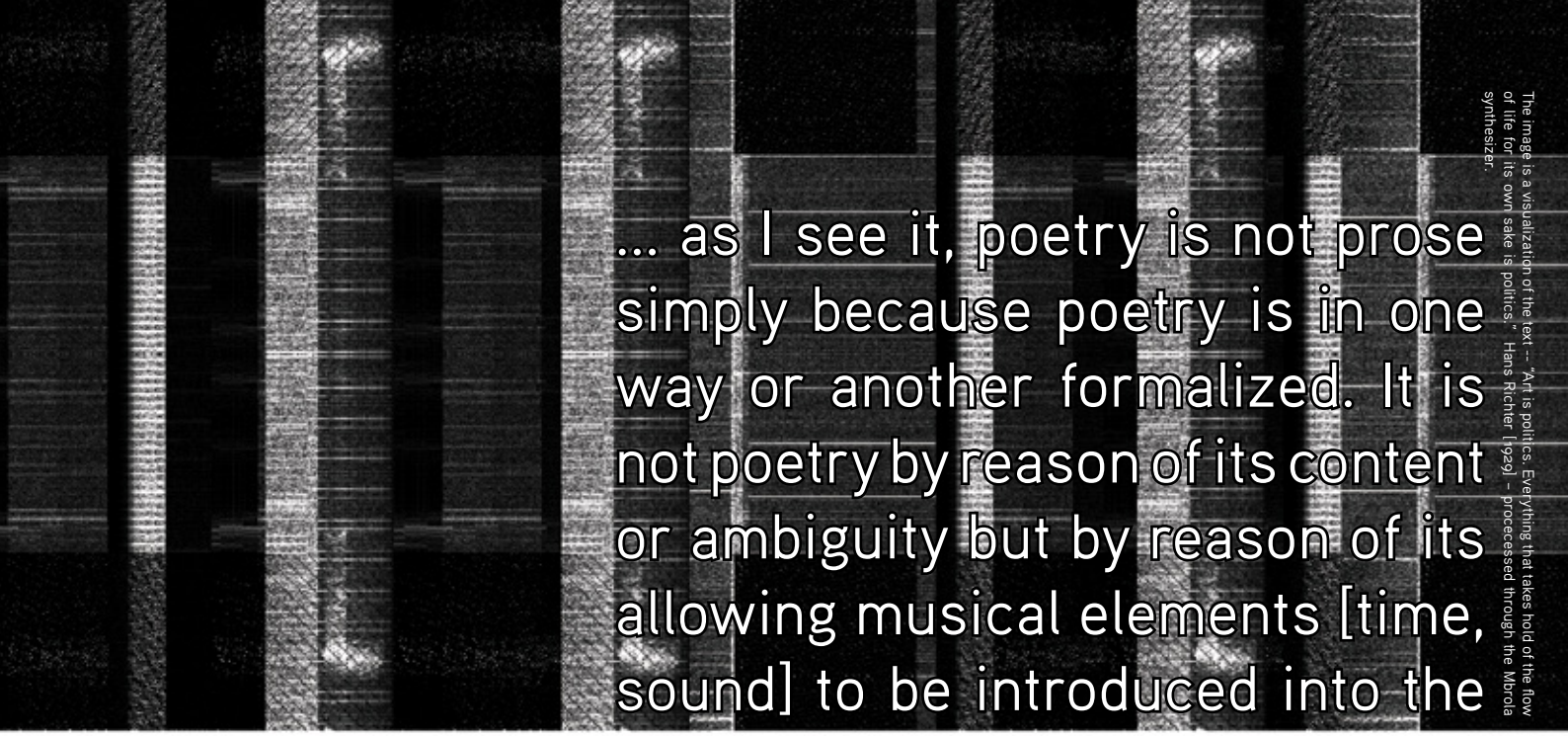
'Language' and 'speech' are the most prominent human means of expression. Remarkably, on one hand language is a means of communication, on the other it is a barrier to communication between distinct actors, due to its complex structural and semantic characteristics.

Fascinated by this double role of language, by its simultaneously defining and disrupting function, especially when situated in the interaction between humans and machines, No2Pho formulates an artistic answer to this complex behaviour of language and speech, both in an analytical and in a synthesizing manner.

The synthetic speech generated in realtime is coupled to different behaviours of the system, both of which are generated and modulated by the spatial coordinates of the human visitors. The physical world, represented by the psychogeographic trajectory of the visitor, is mapped on the virtual world, which consists of 36 sound sources. The visitors wear wireless headphones, equipped with 'crickets' [a wireless sensor network]. The crickets network registers the movement coordinates of the visitor, using RF and ultrasound technologies. The localization data is then used to modulate the parameters of the phonemes, adapting the realtime synthesized sound to the continuous movement trajectories of the visitors. Through this psychogeographic link, the visitor can 'penetrate' and interact with the sonic world.

At a given location in the space, different sound sources converge. The visitors have access to the complete sound information only at this particular position, enabling them to extract their own semantic meaning of the whole. The sonic experience is always tied to an individual, and as such it becomes a momentary display of the interaction between human and machine within the same system. Sometimes the system will 'sing', other times it will 'whisper' or 'stutter' or 'frostily recite' the information, depending on the cooperation between the physical and the virtual.

It's a play between the interwoven parameters of the physical and the virtual network. People and voices. Wireless headphones and multiple spatialized sound sources. As people walk their trajectory through physical space, their localization data changes continuously. Synthetic voices are generated in real time, frequency and pitch modulated by the variable parameters of localization and orientation: different pitch sets, tonal and timbre variations, cadence and accidental moments. In this way the text can be physically crossed and experienced according to the listener's own position. Voices are layered and mixed by movements and trajectories through space. The perception of this new-born sound poetry is externalized on three levels: the understanding of language, the musical nature of language, and the linguistic nature of music.



The image is a visualization of the text -- "Art is politics. Everything that takes hold of the flow of life for its own sake is politics." Hans Richter [1929] – procecessed through the Mbrola synthesizer.

... as I see it, poetry is not prose simply because poetry is in one way or another formalized. It is not poetry by reason of its content or ambiguity but by reason of its allowing musical elements [time, sound] to be introduced into the world of words. *John Cage*

on words and letters

The direct source of inspiration for this project is the formal, while simultaneously poetic approach to linguistics by collectives such as the Lettrists and Oulipo. These groups experimented with words, sounds and letters in the utmost creative and revolutionary manner. The treatment of text is entirely sonic, emphasizing the formal deconstruction of words and letters, as well as the rhythmic representation of separate graphemes within a musical structure.

"Destruction of WORDS for LETTERS
This does not mean: destroying words for other words. Nor forging notions to specify their nuances. Nor mixing terms to make them hold more meaning.
But it does mean: TAKING ALL LETTERS AS A WHOLE, UNFOLDING BEFORE DAZZLED SPECTATORS. MARVELS CREATED FROM LETTERS [DEBRIS FROM THE DESTRUCTION]; CREATING AN ARCHITECTURE OF LETTRIC RHYTHMS; ACCUMULATING FLUCTUATING LETTERS IN A PRECISE FRAME; ELABORATING SPLENDIDLY THE CUSTOMARY COOING; COAGULATING THE CRUMBS OF LETTERS FOR A REAL MEAL; RESUSCITATING THE JUMBLE IN A DENSER ORDER; MAKING UNDERSTANDABLE AND TANGIBLE THE INCOMPREHENSIBLE AND VAGUE; CONCRETIZING SILENCE; WRITING THE NOTHINGNESS.
It is: the role of the poet to advance toward subversive sources. The obligation of the poet to advance in the black and burdened depths of the unknown. The craft of the poet to open one more treasure-room door for the common man."
MANIFESTO OF LETTERIST POETRY by Isidore Isou, 1947

The accent on the sonic qualities of letters and words pushes the semantic meaning of the text to the background, while confronting listeners with the straight aesthetic experience. Words become physical and unleash a particular sensitivity within the audience; a direct and sensual sonic occurrence. The poetry is freed of its prose, which tends to emphasize the content, disregarding the performative value of text. The kernel of poetry is probed: quasi-invisible, highly intimate elements of experience are transmitted through an appealing sonic base. A physical experience of the sender and the receiver becomes entangled; a synaesthetic drift in the imagination of 'the other'.

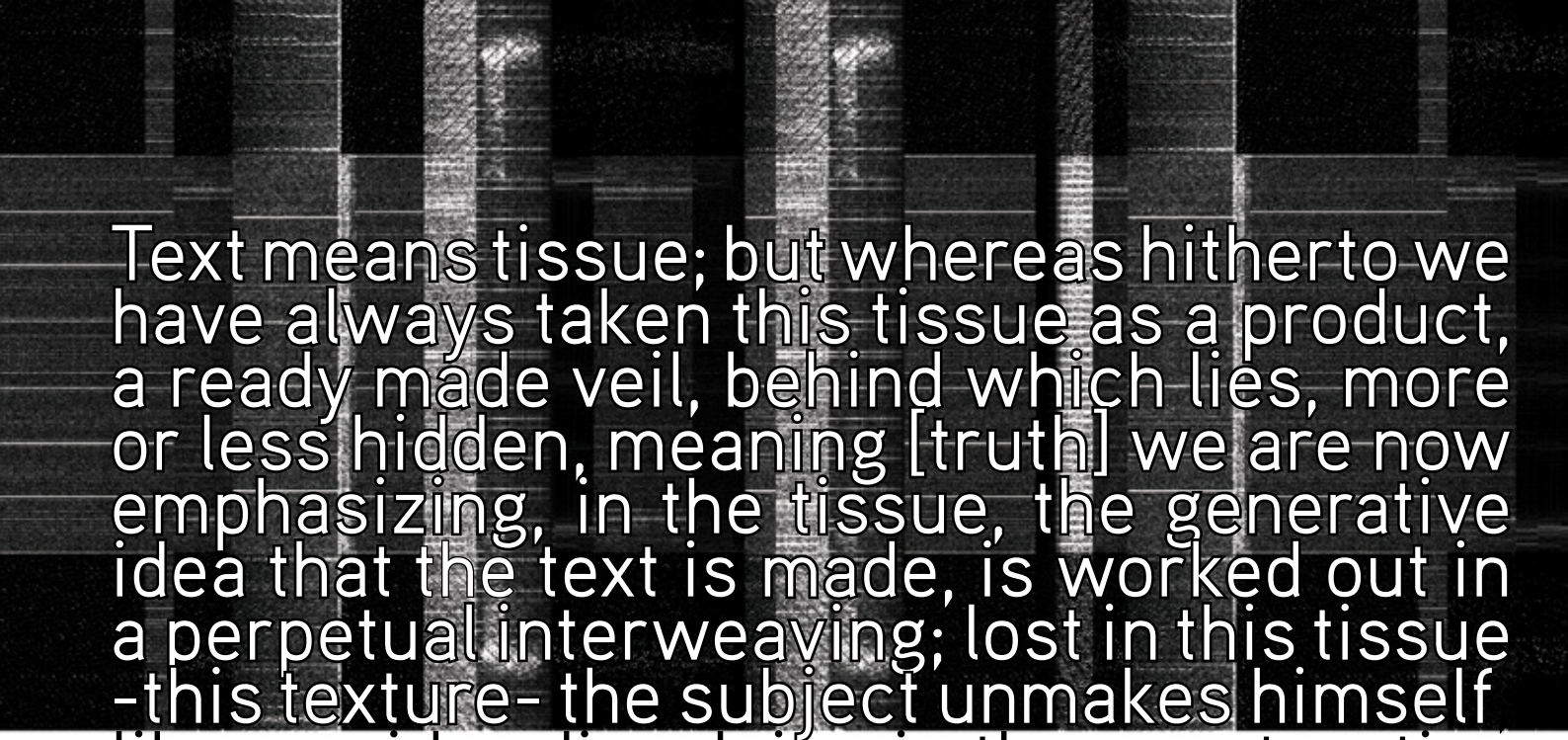
the performative voice

Since time immemorial artists of various flavours experimented with the phenomenon of 'voice'. The voice is our primary means of communication, as well as one of the most robust human technologies, expressed in speech and singing.

New techniques for human-computer interaction and communication have to be tested within new structures; similar to scientific ideas being tested within scientific experiments. Sounds should be synthesized by combining frequencies, each of them with their own intensities, elapsing within a given time frame. Sounds constructed from code.

Within No2Pho, the two-way human interaction of the Lettrists is researched from the digital and technological perspective, the two-way human-computer interaction. All speech is computer-generated in real time, without application or sampling of the human voice. The behaviour and display of this speech is created by human individuals, whose spatial trajectories modify the parameters of the phonemes, attuning the pitch, timbre and rhythm of the synthetic voices.

This technique emphasizes the performative talent of the performer, in this case the computer, while depriving the text [in the first layer] of the restrictive intellectual approach to spoken expression. Text is described following the structure akin to music. The notes in a score have their contextual meaning removed, functioning only as symbols. However, between words as phonetic material, as well as between the functional phoneme-units of this material, there exists an evident relationship. In verbal language the link between the signifier and the meaning is arbitrary, which makes it possible for a word to be seen as a symbol [de Saussure, Peirce], while the musical note can be seen as free of all arbitrary meaning.



Text means tissue; but whereas hitherto we have always taken this tissue as a product, a ready made veil, behind which lies, more or less hidden, meaning [truth] we are now emphasizing, in the tissue, the generative idea that the text is made, is worked out in a perpetual interweaving; lost in this tissue -this texture- the subject unmakes himself, like a spider dissolving in the constructive secretions of its web. *Roland Barthes*

It is important to design a system fit for expressing this concept in an appropriate aesthetic manner. For this design No2Pho deploys technology developed in the speech laboratory of the Université Polytechnique Mons. With the Mbrola speech synthesizer, based on the phoneme-system within which frequency and pitch can be annotated, the sound can be constructed and 'directed' down to its finest grains.

While being immersed in the system, the visitors discover their influence on the aesthetic display of the voices. After some time, they will discover the second, semantic layer of the work. The conscious migration of the visitors through the space guides them to a convergent position, where all information streams gather. 'Space' becomes a new dimension and an essential component of the system. Extracting meaning requires collaboration with the machine.

link to the space

Psychogeography is a study of specific effects of the geographic environment which [with or without particular order] influences the emotions and/or the behaviour of the individual. The Situationists linked psychogeography to the term 'situation', in the philosophical, scientific and artistic fields. The term situation includes the notion of 'locality', in physics defined as 'remote or far removed objects cannot have direct influence on each other. An object can be directly influenced by another object if existing in its immediate surroundings.'

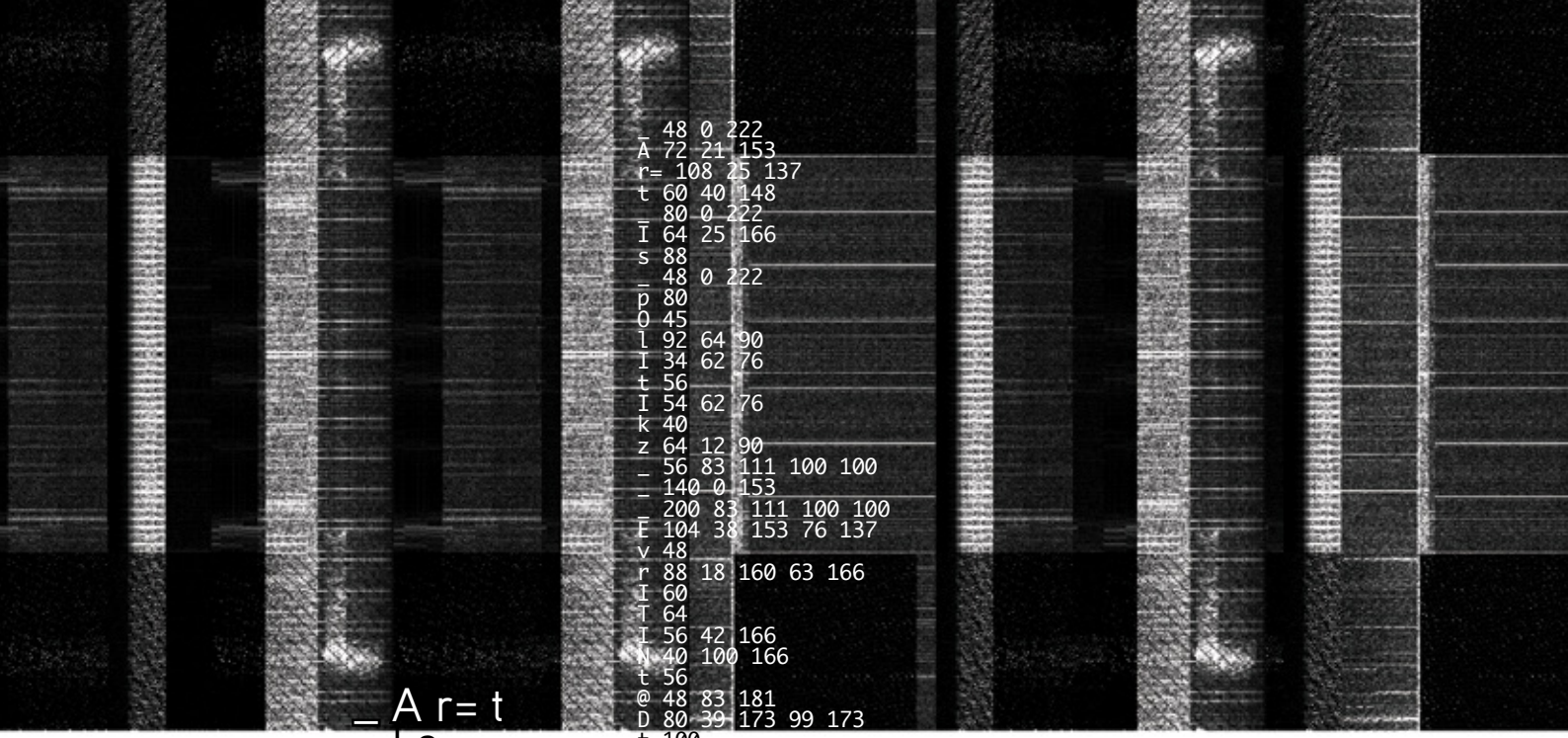
'Derivé' or 'drifting' is one of the approaches coined by the Situationists [especially Guy Debord]. Drift is a technique where a person rapidly evolves, passing through different emotional moods and urban ambiances, guided by the invisible streams of a city. 'Derivés' demand an open and constructive behaviour from their participants, who should be conscious of the psychogeographic effects [both on themselves and the environment]. The Situationists envisioned that approaching and exploring the space in such a way, the space will open up to the individual, unveiling previously unexplored psychogeographic characteristics. This approach is opposed to the automatized behaviour of an individual, who usually follows the same 'parcours', without exploring the space and its hidden qualities.

real-time
human-machine interaction

Being a part of a living system implies that all components of the system interact with each other in real time.

Real time: "of or relating to systems that update information at the same rate as they receive data, enabling them to direct control of a process, or the time it takes for the process to occur". Steven Dixon

The poetics of an artistic environment cannot be reduced to separate materials or elements that constitute it. 'Process' as a medium becomes a communicator between the elements of the artwork and the individual. The concept of the work is woven through the process and can, as such, be transmitted to the individual. The individual can then inscribe the whole in a specific communication stream.



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"Art is politics. Everything that takes hold of the flow of life for its own sake is politics." Hans Richter [1929] procecessed through MBROLA.

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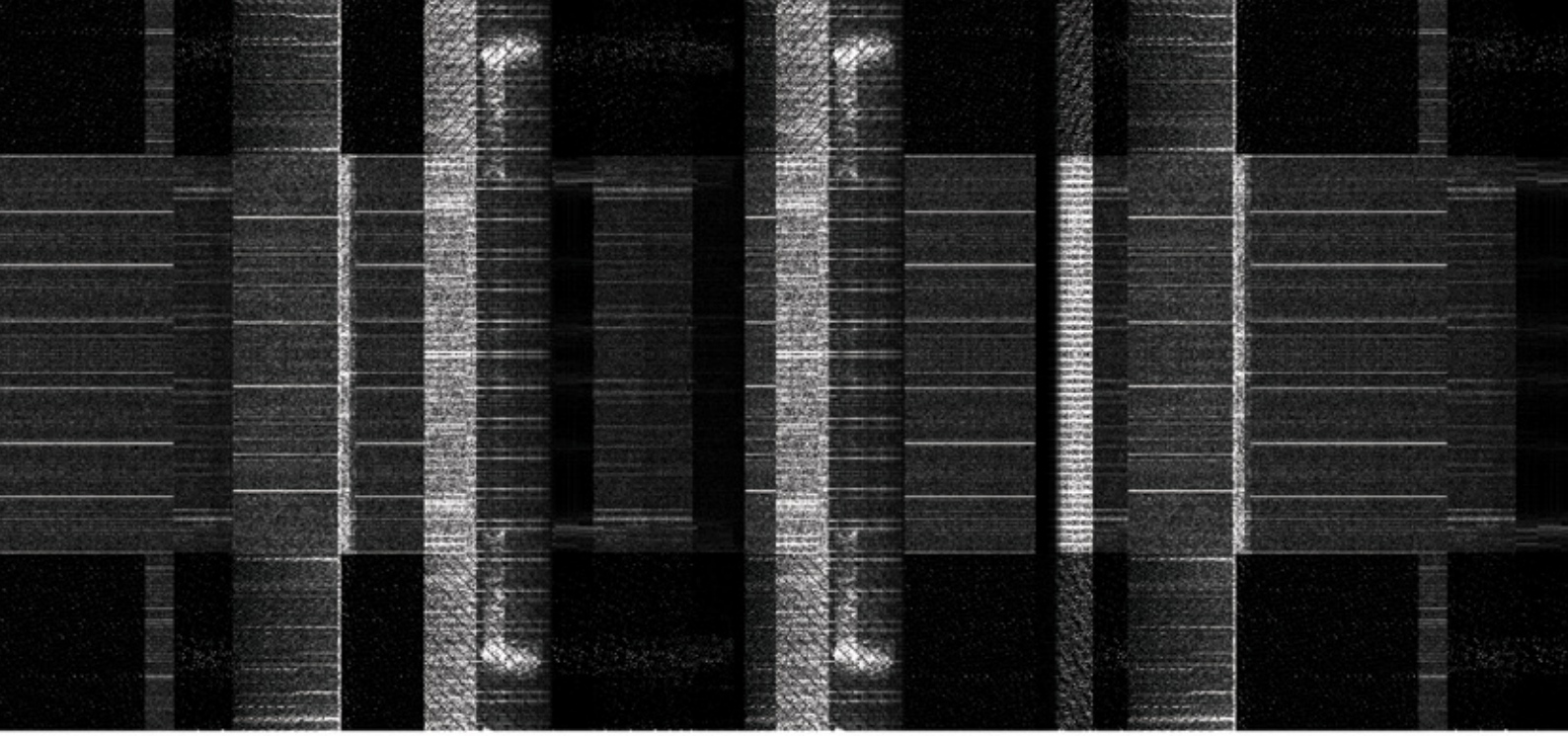


In this process of exchange, the individual drifts in and out of generated information, which gradually forms into a coherent whole, until the moment in which the visitor begins assigning meaning to the experience. Partially due to the input of individual's own variable parameters [space, time, culture], the artistic system finds itself in a continuous process of creation. Schematically, we can describe the flow of information in this system as follows:

sender [the work] › code [the relationship between the separate elements which constitute the work] › medium/signal [the channel in which the transmission occurs] › reconstruction/decoding [the rebuilding of the information by the individual] › receiver [interpretation by the individual].

The transmission is always disrupted by a particular type of noise or interruption of the signal. The individual will have to interpret this signal and select correct information by ordering the elements in a specific way. While decoding the signal [which depends on their position in the space, as well as on their personal anticipations], the visitors send information back to the system. In this process, the receiver becomes the sender and the initial sender becomes the receiver, creating a feedback loop. The information that is transmitted is based on this continuous correlation and exchange.

For optimal communication with the system the environment can be experienced by only one visitor at the time, except if additional people can be considered as 'interferences' and integrated as such in the functioning of the system.

Given that every signal is continuously coded, transmitted, decoded and sent back, the artistic environment finds itself in a constant state of transformation. The sender and the receiver become two systems inherent to the work itself as they interact and unceasingly modify each other's conditions. Furthermore, the work itself changes due to the transformations of these two systems. The visitors will interpret a real-time artistic work based on the duration of their participation in the system. The work will continuously unfold and adapt its own elements, becoming a self-organizing system.

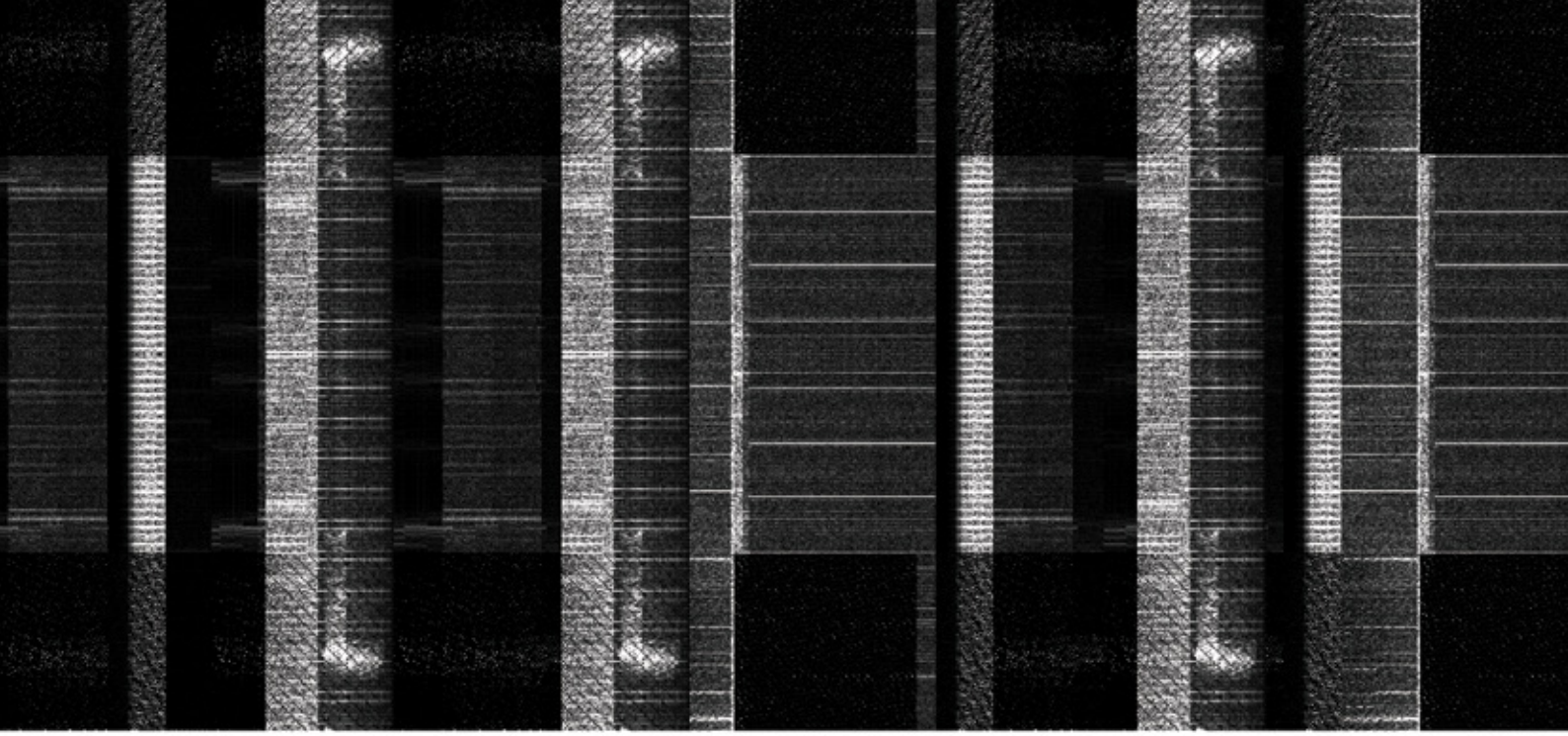
methodology

A selection of existing texts gives shape to the basis of the work. These texts are selected as a commentary on specific situations within our arts and cultural society [Richter, Flusser, Stein, Beckett...].
The analysis of the text occurs in real time, by translating graphemes to phonemes, together with their corresponding frequency and pitch values. The phonemes are resolved and every virtual voice is assigned a specific set of behaviours.

The synthesis is influenced by the visitor. All parameters for the display of the synthetic voice are linked to the 'distance factor' of the individual. Based on the formal composition, the individuals themselves determine the speed in which the semantic meaning of the text becomes clear, or becomes utterly deconstructed, completely descending into noise.

The multi-platform output requires a dual interface structure: a sensor-triggered human localization/response, and a computer-mediated rendering of the data through the Mbrola speech synthesizer, which emulates intertwined phonological, prosodic and musical properties of speech.
The MaxMbrola object processes phonetic strings of text and allows the speech processing to be integrated within the Max/MSP environment, linked to the data gathered by the sensor network and finally binaurally spatialized.
Once generated, the synthetic voices are treated through a specific DSP [digital signal processing]. The correlation between the distance factor and the phoneme-parameters [with the addition of DSP effects] generates a range of possible varieties for the creation of realtime sound and image.

The result is a combination of physical action and machine aesthetics.
It's a human-machine collaboration. ¶



endnotes

The Lettrism movement was founded in the late forties by Isidore Isou [1928]. In the development of the art of poetry, Isou saw the Lettrist at the end of a long chiselling phase which had begun with Baudelaire reducing narrative in his poetry to anecdote, then Rimbaud disregarding anecdote for lines and words, Mallarmé reducing words to sound and spaces and finally the Dadaists destroying the word altogether. Isou saw at the end of this phase the new beginnings of an amplic stage for culture, from which a whole host of new arts, ways of working, and social institutions would eventually spring.

http://en.wikipedia.org/wiki/Lettrism

Oulipo was founded in the 1960's and stands for "Ouvroir de littérature potentielle", which translates as "workshop of potential literature". It is a loose gathering of French-speaking writers and mathematicians, and seeks to create works using constrained writing techniques.

http://en.wikipedia.org/wiki/Oulipo

Ferdinand de Saussure [1857-1913] was a Swiss linguist, considered by many to be the father of structuralism. He laid the foundation for many developments in linguistics in the 20th century. He perceived linguistics as a branch of a general science of signs he proposed to call semiology or semiotics.

http://en.wikipedia.org/wiki/Ferdinand_de_Saussure

Charles Sanders Peirce [1839-1914] was an American polymath. An innovator in fields such as mathematics, research methodology, the philosophy of science, epistemology, and metaphysics, he considered himself a logician. He saw logic as a branch of semiotics, of which he is a founder. In 1886, he saw that logical operations could be carried out by electrical switching circuits, thus anticipating the digital computer.

http://en.wikipedia.org/wiki/Charles_Peirce

The Situationist International is an international political and artistic movement which has parallels with Marxism, dadaism, existentialism, anti-consumerism, punk and anarchism. Formed in 1957, the SI movement was active through the 1960s and had aspirations for major social and political transformations.
Guy Debord [1931-1994] was a writer, film maker, hypergraphist and founding member of the groups Lettrist International and Situationist International.

http://en.wikipedia.org/wiki/Situationists

http://en.wikipedia.org/wiki/Guy_Debord

‹so-on› , currently developing the No2Pho-project, is a group of artists working with image, sound and technology. So-on aka unamas is working with voice, language, text and sound in a transdisciplinary and convolutional way.

Edo Paulus is using generative processes to create sound and musical textures resulting in automatical music-generating software, live music performances, sound-installations and audio for interactive imagery.

Sukandar Kartadinata is a technician focused on custom music&art technology.

http://so-on.be

http://eude.nl/

http://www.sukandar.de/

http://www.glui.de/mainframe.html

The MBROLA project, initiated by the TCTS Lab of the Faculté Polytechnique de Mons [Belgium], is developing a set of speech synthesizers for as many languages as possible, and provides them free for non-commercial applications. The ultimate goal is to boost academic research on speech synthesis, and particularly on prosody generation. The MaxMBROLA Project is an MBROLA-based real-time voice synthetizer for Max/MSP.

http://tcts.fpms.ac.be/synthesis/mbrola.html

http://tcts.fpms.ac.be/synthesis/maxmbrola/

Translated by Maja Kuzmanovic

Somebody's Voice, Nobody's Voice and 100,000 Voices

On Orality and Polypoetry at the Dawn of the 21st Century

Jelle Dierickx

(...) les quatre coins de la conscience de l'Homme où nichent le son, le geste, la parole et le souffle qui crache la vie.

Breathe in ...

In Uno, nessuno e centomila (Somebody, nobody and 100,000), written in 1926, Luigi Pirandello describes how his protagonist Vitangelo Moscarda undergoes a complete identity crisis. The cause is an apparently casual remark from his wife:

'What are you doing?' my wife asked, when she saw me dawdling for an unusually long time in front of the mirror.

'Nothing,' I replied, 'just looking at my nose, in this nostril. It hurts a bit when I touch it.'

My wife smiled and said: 'I thought you were looking at how crooked it is.'

From that moment on, his reflection becomes an obsession, together with the thought that he is 100,000 different people through the gaze of others, and that at the same time, that idea turns him into nobody.

The question is whether Moscarda would have experienced the same crisis if his wife had pointed out that his voice was a little grating. If so, we may wonder if the book would have been as successful as it was. After all, Western culture is very much oriented towards the visual.

If there is any discussion of the voice in the book that Pirandello worked on for fifteen years, it is to emphasise unreliable aspects of our communication system:

'But the trouble is, my friend, that you will never know what your words become inside me, and I will never be able to explain it either. It's not like you were speaking Turkish or something. The two of us, you and I, were using the same language, the same words. But is it our fault, yours and mine, if the words themselves are empty? Empty, my friend. And you put your meaning into them when you say them to me, but when I hear them, I cannot do otherwise than put my own meaning into them. We thought we understood each other perfectly: but neither of us has understood anything of what the other was saying.'

It goes without saying that the voice can communicate in more ways than just at the verbal and semantic level.

If we were to list a couple of points concerning the use of the voice at the beginning of the 21st century, we will probably have to conclude that we are dealing with somebody's voice, nobody's voice and 100,000 voices.

To clarify this, two aspects that are prominent at the beginning of the 21st century must be discussed in further detail: the impact of multimedia and the apparent return of orality. This clarification creates more questions than it answers, but it is probably worth the effort of asking these questions.

A multimedia voice

The French poet Guillaume Apollinaire was made aware of his own voice at the Sorbonne in Paris in December 1913. That was when he received his first opportunity to make a sound recording of several of his poems. The man was sensitive enough to realise that this event would have consequences as far-reaching as Moscarda's problem with his nose.

Jean-Pierre Bobillot speaks of the impact of the birth of an audiosphere and of a determining moment when Apollinaire realised that new rules would apply in the mechanical and later on the electronic era.

Apollinaire confessed at this moment that: 'Comme je fais mes poèmes en les chantant sur des rythmes qu'a notés mon ami Max Jacob, j'aurais dû les chanter comme fit René Ghil, qui fut avec Verhaeren le véritable triomphateur de cette séance.'

Bobillot concludes from this:

'Qu'est-ce à dire sinon qu'il se reproche, après-coup, de n'avoir pas su tenir compte de la spécificité de la technique et du support auxquels il se trouvait soudain confronté ? Ils lui auraient en effet permis d'intégrer au poème lui-même tout ce que la typographie et le papier, par leurs caractéristiques conjuguées — que relayait une diction par trop convenue, réduite à une illusoire oralization de l'écrit —, en excluaient : sa propre « enveloppe » intonative, sa corporéité phonatoire, sa dynamique. Ou en d'autres termes : sa venue, que la page imprimée et la parole socialisée tendent à évacuer, solidairement, à l'exclusif profit de la tenue morpho-syntaxique de l'énoncé — et de son contenu. Ce pourquoi, très précisément, il avait décidé in extremis de supprimer toute ponctuation sur les épreuves d'Alcools.'

If Apollinaire were still alive at the beginning of the 21st century, he probably wouldn't know where to begin. Developments in multimedia have progressed so fast that it is difficult to absorb their implications, let alone apply them consistently to the poetic medium. Up to now, the majority of poets have not yet digested the 19th century, and so the insights of Apollinaire & Co. remain a current topic. The gulf between the unstemmable flood of words that refuses to face – or hear – multimedial poetics is immense. There are only a handful of poets in Europe who are applying the achievements of the digital age in a relevant and meaningful way: if not its technical aspects, then certainly its way of thinking. In previous articles, I referred to the scene where this does sometimes occur as 'polypoetic'. This term is completely superfluous in the sense that only 'poetry' exists, but it is necessary in this discourse in order to avoid confusion, given that poetry is all too often conflated with the (written) Word.

However, we should not make the mistake of applying the term 'multimedia' to new media alone. Or, as the philosopher Bart Vandenabeele rightly remarks:
The one-sided application of the issues of new media in art to new, Western technologies is, among other things, ethnocentric: the use that Chris Ofili makes of elephant dung in his work, or that economically backward Huichol Indians make of beads from the Czech Republic, Slovakia and Japan to create their masks, is at least as much (or as little) a question of multimedia as video or media art à la Bill Viola or Pipillotti Rist.

He then concludes that the question is not 'what is art in cyberspace or hyperreality,' but 'how does cyberspace change the production and reception of art in our world.'
However it is still not easy to determine with any certainty which voice(s) we hear in the aforementioned cyberspace.

A virtual voice

In our time the voice no longer needs breath, only bits. The electronic/digital body is everywhere, although it seems to go unnoticed by most people.

My first question is whether Heidegger's dichotomy, which Albert Borgmann applies in Technology and the character of contemporary life, also applies here. Is it so that the voice is no longer seen as a thing, but as a device? Just as we have forgotten that it is not really normal for water to come out of the tap or that we have not always been able to speed along at 80 miles an hour along seemingly endless stretches of tarmac. Is it possible to lose touch with your own voice? To consider your voice as a mere device? Just as there is a demand for instant products (whatever the cost, as long as they're cheap), is there a demand for instant voices, with no commitment to what they are saying, no impact, but efficient in their ability to acquire products?

The disappearance of the voice as a thing is linked to the emergence of the virtual body. After all, the voice is not only a device for conveying semantic messages (and, from a biological perspective, it is not even designed to do so).

Joke Dame writes about this issue in her study of the 'singing body,' discussing sung frequencies here: The tension in the vocal cords, pharynx and larynx, in other words, the physical exertion needed to produce a note, is certainly characteristic. The same applies to the resonance cavities. The shape of the nose, throat and mouth cavities has a great influence on the sound of the voice. In other words, you do not only hear a certain frequency, you also hear a body. Barthes would say: you mainly hear a body.

This begs a second question, concerning communication. What message does a virtual voice carry?

'Hello. This is Gina. I'm online right now, but if you leave a message, I'll get back to you.' That's what you'll hear if you call me while I'm on the Web.

While you are creating a virtual body in silence, your digital voice repeats the same message time and again. It seems certain that this voice will have an increasing impact, because money is involved, and a lot of money at that.

Coppercom, a company set up in Florida in 1997, which specialises in VoB (Voice over Broadband) solutions and network technology, claims the following in a 'White Paper':

Eight of every ten dollars earned by carriers in the US is earned on voice services of some sort. For the local exchange carriers, voice is such a dominant revenue source that even voice custom calling features earn more revenue than all data services combined. Given such a large voice revenue stream, even data-centric carriers would have to expect to offer voice services to maintain a competitive position in the face of multi-service discount policies. Yet some have said that in the network of the future, voice will be a free premium given to attract data customers.

There is certainly no shortage of such basically non-speaking virtual voices. Experienced chatters know how to use all kinds of emoticons, but may themselves remain completely indifferent to them, and cannot know whether a given emoticon meets with the same genuine emotion. The - often androgynous - electronic voice speaks or sings to an anonymous audience. In that grey audience, however, each individual believes that the voice speaks to him or her specifically. Just as TV, film and so on convey an apparently personal message. At a basic level, this is the same effect that even books have.

It seems, then, that there is not much new under the sun, as far as the silent voice is concerned. Is this also the case for the sounding voice?

Vox antiqua = Vox nova?

The human voice cannot be dislocated from the notion of history. We speak of an oral tradition, but to what extent can we speak of a straight line? It may seem clear enough that we are not living in the time of Beowulf, the Arabian Nights, the Chanson de Roland or Homer's Odyssey. The box office success of recent Hollywood productions of Troy and The 13th Knight and the Disney cartoon Aladdin might suggest the opposite, however. Stories (in whatever form) have never left us, and probably never will, for as long as human beings still hear their own voices. Or as philosopher Karel Boullart puts it:

We are children in the dark, who light candles not to drive the darkness away (it wouldn't work) but to convince ourselves that it isn't there. The 'Ding an Sich,' is unknown and cannot be contained in knowledge. It seems that the consequence of this is that we can only grasp the world and understand it if we tell stories about it.
(...) We rely on stories because we are mortal and because we know it.

The fact of the continuous presence of stories great and small is clearly not the most transparent of situations. In the 21st century, everything exists at once, all opposites co-exist and in that sense cancel each other out: the belief in a god or gods and rejection of this belief, belief in science and rejection of it, the most finely wrought classical music and the most banal of pop music, to give a few examples.

Can an individual still hear his or her own voice amidst this confusion? Does he or she hear the voice of others? How many others? How many voices can an individual cope with?

Is it not the broken, smothered or duplicated voice of the polypoet that deals with these questions – or, precisely, does not deal with them – in polypoetry? Is this way of acting on the current climate not a present-day form of incantation, weaving the thread of a story through a web that appears impossible to untangle?

Who hears voices?

A voice is created as it were time and time again. Each time we express something orally (aurally), the result is fairly unpredictable: it will inevitably be something different from the last time. Or as Friedrich Nietzsche puts it in the 333rd aphorism in Menschliches, Allzumenschliches:

Gefahr in der Stimme.-Mitunter macht uns im Gespräch der Klang der eignen Stimme verlegen und verleitet uns zu Behauptungen, welche gar nicht unsren Meinungen entsprechen.

Just as deconstruction unravels a multiplicity of voices in a text, we can obviously also speak of multiple voices in the domain of sound. A multitude which, according to Marcel Cobussen and Jacques Derrida, cannot be reduced to a polyphony or polytonality:

The desire for a transparent voice is a dream, an illusion. Every general Verstimmung at all times interrupts a familiar harmony.

Who hears which voice(s) in this inharmonious muddle?

The voice of the one god at the beginning of the 21st century may be nobody's voice, but for 100,000s of people, that voice sounds loud indeed. The same is true of the one Poet: nobody believes in it, but you can hear it everywhere. The voice of Apollinaire is somebody's voice, but how far does it carry? Ligeti, Xenakis, Penderecki and numerous other composers have captured the voices of 100,000 in their compositions, or is this here, too, just the voice of that one composer? The virtual voices that glide through the ethernet screech in silence, or are they the nerves and neurons of a thinking world? Is the so-called 'return of the subject' the return of somebody/nobody among the 100,000?

Are the voices in polypoetry (in the broader sense) not the voices of somebody, nobody and 100,000 all at once?

Breathe out ...

Translated by Helen White

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ScentsoryDesign®: Scent By A Wireless Web

Jenny Tillotson

This article explores Scentsory Design, responsive fabrics that go beyond current micro-encapsulated techniques - by including wireless scent delivery systems that sense and respond to psychological and environmental changes, in order to enhance wellbeing, avoid skin allergies and prevent insect-borne diseases. Scentsory Design creates a personal 'scent bubble' around the user, enhancing the visual message of fashion with medical, sensory and psychological 'wellbeing'.*

I describe the development of a collection of responsive jewelry and accessories, which dispense fragrances when triggered by sensors, reacting to an individual's bodily state and their environment. The creation of an 'emotional fashion' collection, representing a further stage of development, is then described. When it comes to smell and gathering an emotional response, scent is the most powerful trigger of all senses; 75 percent of emotions we experience on a daily basis are affected by smell. The article will conclude by surveying fabric research developed in responsive clothes, which offer social and therapeutic value, i.e. clothes that reduce depression, prevent mosquito bites and replace alcohol in perfume.

Keywords

Colodours*, 'Scent Bubble', Emotional Fashion, Wellbeing, Multi-sensorial, Microfluidics, Lab-on-a-chip, PsychoNeuroImmunology, Odour Annoyance, 'Scentient Screen'

Background

Evolving from the PhD work on 'Smart Second Skin' at the Royal College of Art (RCA) in 1997 and BA Fashion Communication work on multi-sensorial surfaces at Central Saint Martins in 1991, this research straddles the science/art boundary, bridging the disciplines of nanotechnology, analytical chemistry, perfumery, electrical engineering, AromaChology, fashion, textiles and neuroscience.

The PhD described a multi-sensorial approach to biomedical designs, recognising that all senses interact. A 'Smart Second Skin' fabric is a membrane of micro-tubes fused together with microfluidics, electronics and yarns embedded in clothing, creating a scent delivery system that adds a new function to the garment. At the RCA, the research was demonstrated as an interactive installation that pulsed coloured fluid around a transparent sculpture to illustrate colodours: colour-coded scent delivery, able to influence different emotions and moods. The spectrum of scents gave the impression that the sculpture was creating an olfactory experience and was a direct reference to the aroma rainbow emitted from the 'Scent Organ' in the novel Brave New World (Huxley 1932): 'The Scent Organ was playing a delightfully refreshing herbal capriccio—ripping arpeggios of thyme and lavender, rosemary, basil, myrtle, tarragon, a series of daring modulations through the spice keys into ambergris and a slow return through sandalwood, camphor, cedar, and new mown grass…."

Smart Second Skin Research

In this context, the membrane is analogous to the body and human skin. The interaction on this membrane (the pulsing of scents) is therefore mimicking the blood signals and bodily fluids of the human system. Clothing becomes an almost living organism: an internal pump represents the heart of the fabric and the tubing represents the nervous and respiratory system, as shown in the 'Smart Second Skin' dress. As a conceptual piece, the dress interacts with human emotions, whereby the 'aroma dimension' becomes an integral part of the user's sensory space. It is constructed from two layers of white silk organza, with integrated medical PVC tubes, containing coloured liquids, visualising a selection of different fragrances.

The purpose of 'Smart Second Skin' is to increase creativity, expression and vision, spark little reminders, expand colour, texture, sounds and taste, and entice the senses, reminding the users that the world extends beyond sound and vision. It transforms negative moods into positive sensations, releases scents to help sleep, boost confidence, relax, energize, arouse, increase self-esteem, expand the imagination, bring people out of their shells, define self-image, or open users' sense of wonder.

Our Smell System

Odours drive our emotions, warn us of danger, influence our body chemistry and steep us in luxury. We begin our life with smell, as we form a bond with our mothers. Since smell signals have a direct access to the emotional centres in the brain, the emotional shading of our lives is influenced by the smells around us. There are specific areas in the brain where smell memories are received and stored. Smell information travels from the olfactory bulb to the brain-centres handling strong emotions like aggression, fear and sexual arousal. These bunches of neurons also play a significant role in selecting and transmitting information between our short and long-term recall, evoking memories from the past.

Smells arouse emotions of sadness, loss, love, disgust, longing and passion, buried deep in our subconscious. Only a few molecules of an odour are required to convey a message to the brain, creating a smell-image. This smell-image can come from a flower, a memory or place, a person or time, an olfactory evocation.

History of perfumery

The belief that certain aromas have the power to influence our emotional state dates back thousands of years. The Oracle at Delphi inhaled smoke from burning bay leaves to induce a trance-like state; the Greek herbalist Dioscorides noted the soporific effect of myrrh and marjoram; and the earliest civilisations believed the burning aromatic woods and herbs would drive 'evil spirits' from people's minds. The ancient practice of using aromatic substances to uplift the spirit, or cure diseases has been deployed by the world's greatest civilisations. Perfumes were used by the Ancient Egyptians in religious ceremonies, by way of burning fragrant wood and essences to please their gods, the Greeks were the first to use liquid perfumes and the Crusaders reintroduced the art of perfumery to Europe in the 11th century AD. In the 1700s perfume was introduced to mask unpleasant odours, a practice that rapidly became a habit, giving rise to the first perfume houses, which opened in Paris after the French Revolution. There are fashions in perfumes as there are in clothing. Each era has its favourite scents, that evoke the charms of each succeeding age.

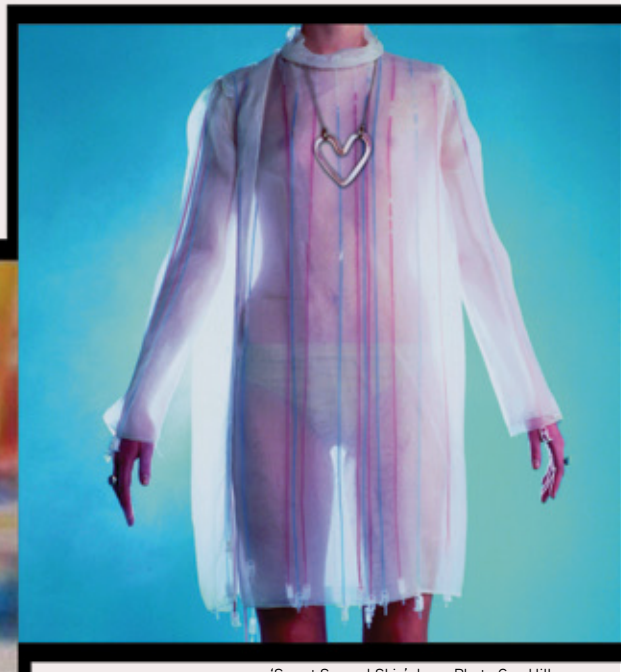
Aromatherapy is a scent-based therapeutic treatment which combats psychological problems such as stress, anxiety and depression by introducing particular combinations of scents on the patient's body and in their environment. Records have shown that aromatherapy oils were used as far back as 3000 BC. The overall holistic approach claims to be more efficient when used for the benefit of the 'whole person', both physically and emotionally. Each essential oil claims to have unique therapeutic properties that are antiseptic, anti-infectious or antispasmodic. Others claim to ease pain and digestion, stimulate circulation, heal skin disorders, increase physical energy levels, facilitate feelings of relaxation, benefit problems relating to stamina, reduce depression, nausea, insomnia, enhance the immune function or even help with radiation burns (Buckle 1999).

Odour Delivery Systems for Scentsory Design

In 1989, The Sense of Smell Institute developed a new partnership of perfumery and science called 'Aroma-Chology'. Through this initiative, perfume companies began employing sensory psychologists to work alongside perfumers. The purpose of the project was to devise experiments in which the scientists could elicit various feelings and emotions, using 'headspace technology'. This technology makes it possible to analyse and synthetically reproduce odours, given off by almost any chemical element, recreating the desired smell in a fragrance and allowing a new palette to take shape. Unlike aromatherapy (which has no science to back it up), Aroma-Chology is not concerned with therapeutic effects on mental or physical conditions, but with the temporary effects of fragrance on feelings and emotions through stimulation of olfactory pathways in the brain. It measures the effects of odorants (single and blended, natural and synthetic) on electrical activity in the brain, physiological responses (such as heart rate and skin conductance), cognitive functions, voluntary and involuntary behaviour (Jellinek 1999).

Video footage from 'The Wellness Collection' – A Science Fashion Story

The kernel problem in any olfaction project is the issue of delivery. To research the technology to be used in responsive fabrics, it has been crucial to delve into nature and divide odour delivery into non-biological and biological systems. Scentsory Design fabrics emulate aspects of biological events in clothes of a radical design, in which one of the primary functions of the fabrics is to act as a global, sophisticated odour communication system.



'Smart Second Skin' dress Photo Guy Hills

Non-biological systems are exemplified by the traditional, passive action of non-interactive fragrance delivery techniques on skin, clothing and in the home. These delivery techniques include conventional perfume bottles, room-freshener diffusion devices, fabric conditioners and microencapsulation methods. Microencapsulation is the process whereby

tiny particles are surrounded by a coating made of small capsules with desired properties. Once the coating is broken, droplets of fragrances in the capsules are released.

Scentsory Design focuses on biological systems, which are both active and interactive. In particular the research is concerned with body odour delivery in mammals,. An animal will sense biologically relevant odours, which leads to activation of the odour glands (pumping of odours). Inspired by these biological systems, responsive designs can mimic pulsing a fragrance around a fabric and imitate biological references to odour glands. If such a scent delivery is to be feasible and have the desired effect it must be used at exactly the right time and in short bursts (similar to the mammalian examples). However, since our sense of smell is so idiosyncratic, it would be impossible to attempt to change people's moods using one single fragrance with the same effect on everyone.

The process of transporting smell is more complex than a focus on the mechanics and electronics of pulsating delivery systems would suggest. Several difficulties with chemical issues have been encountered, together with the issues of threshhold timing and compatibility between jewelry, fabric and microfluidic materials. The primary ethical concerns relate to the potential for odour pollution, originating from the pulsing of chemicals onto a localized area. However, the advantage derived from this research is that it allows for the targeted delivery of minute droplets of scent which is more efficient and economic, focusing on intimate and personal use rather than generalized and higher volume use.

The fragrance industry is taking odour pollution seriously and addressing fragrance-sensitivity issues. As there is an increase of asthma in children, which could be connected to odour-injected pathways, it is important to emphasise that scent delivery with microfluidic technology will be mineralised and controlled accordingly. Most lab-on-a-chip research papers focus on chemical or biochemical analysis and other applications where pollution is not a significant issue. Current research suggests that micro-devices require only small volumes of sample and reagents, and produce only small amounts of waste, which can often be contained within a lab-on-a-chip device (Weigl, et al., 2003)

'Scent By A Wireless Web' Photo Tomek Shierek

African Bombardier Beetle. Photo courtesy of Professor Thomas Eisner Cornell University

'Scent Whisper' Photo Don Baxendale

Lab-on-a-chip

This study has provided a new method of aroma delivery. In collaboration with analytical chemists Prof. Andreas Manz (who pioneered the 'lab-on-a-chip') and Dr Gareth Jenkins from the Institute of Analytical Sciences in Germany, small microfluidic devices were implanted into responsive jewellery and bags. Microfluidics is a new technology involving the design and production of devices that deal with extremely small volumes of fluids. These devices can combine electrical and mechanical components, down to a characteristic scale of one micron. Microfluidics is the generic technology of manipulating fluids on a chip, including the integration of pumps, valves, mixers and reaction chambers, which enable the fabrication of microreactors and lab-on-a-chip devices (Brunnschweiler et al., 2000).

Other research that explores 'chemical warfare' has identified the principles for defense mechanisms in African bombardier beetles that squirt predators with a high-pressure jet of boiling liquid in a rapid-fire action (Eisner and Aneshansley, 1999). Along with fluidic references to the human body, it is the bombardier beetle's innovative delivery system that offers further inspiration for the fabric research and development in this paper.

Insects have an acute sense of smell. They send pheromones at prospective mates from secretory organs, with the architectural device of specialised brushes, fans, lattice-like hairs, inflated balloons and glands. (Wyatt 2003). Their robot-like response to odours and their scent delivery system was a vital inspiration for the delicate mechanisms behind the design work for Scentsory Design fabrics.

In order to understand the purpose of a Scentsory Design fabric, it is necessary to compare it with the dynamic properties of human skin: a tough, waterproof, continuous living tissue and the largest organ of the body. The skin is not merely a thin boundary protecting the inner person from the outer world, but a multi-layered organ called the dermis which has its own nervous system and blood supply. New cells are constantly pushed to the surface, changing function and shape on their long journey. Skin is an excretory organ and defense barrier holding the internal organs together. A third of the body's blood is pumped from the heart to the skin. Furthermore, the skin is the major point of contact with the surrounding world, where sensory messages are received from the external environment, which are then passed to the brain.

Human skin is perforated with approximately two million sweat pores, distributed unevenly around the body, e.g. palms of the hands, forehead, nose, armpits, groin and soles of the feet. Sweat glands lie deep in the dermis and spiral through layers of horny cells and out of tiny pores. Not only do these glands predominantly produce salty fluids, but also pheromones from the modified scent sweat glands, aiding sexual

attraction. Pheromones, or 'social odour magnets', are chemical messages produced by one member of a species that influence the physiology, hormone levels and behaviour of another member of the same species. Much of the research in Scentsory Design fabrics will include work with human sex pheromones (Thornhill and Gagestad 2002).

Scentsory Design fabrics will contain a skeleton intelligence with an array of sensors and micro-tubing, similar to the body's capillaries and internal nervous network system. Once the initial trigger occurs, the 'Smart Second Skin' interface will have the capability to read the body's physical and mental state, i.e. detect stress and respond accordingly by pulsing fragrances to the nose receptors.

Emotional Fashion

This paper investigates the extent to which microfluidic technology embedded in responsive jewellery and 'emotional fashion' garments can improve quality of life. Not only to benefit human wellbeing through olfactory stimulation of the autonomic nervous system, but as a novel communication system, able to send an aroma 'message' that could be informative, protective, seductive or healing.

Digital Fragrance

Fashion exists for a reason: it is a display of information about personal identity, primarily through strong visual cues. Scentsory Design adds aroma to fashion design by adding active, 'scentsory' capabilities to fabrics and clothing. The goal is to use a variety of scents as a social and therapeutic tool to improve mental wellbeing, by embedding fragrances in responsive, as well as fashionable clothing.

There is little evidence of similar electronic or smart textile research to be found. Scentsory Design seeks to remedy the limitations of current work on scent-output devices, suitable for custom control applications on a micro-scale. Recent digital fragrancing research includes 'Pinoke' by Aromajet and 'Trisenx' (computer games), 'Kaori Web service' by K Opti, 'Scent Mail' by Telewest (web messaging systems) and 'ScentStories' by Procter & Gamble (scent-emitting CD player), but these technologies are too big to embed in fashion items. The textile industry has benefited from microencapsulated scented fabrics since the 1970s and more recent applications include moisturising, deodorising, vitamin, insect repellent, anti-cellulite and anti-stress fibres (Hibbert 2004). However, these standard techniques are not active, as they are unable to detect stress and respond to other feelings that the user might want to be protected from (e.g. fear or sadness).

The basis for Scentsory Design is supported by research which has demonstrated that (1) olfactory substances are capable of increasing an individual's wellbeing through changes in electrical brain activity, and that (2) scent chemicals have the power to evoke emotion (Vernet-Murray et al.,1999). As a result, it is anticipated that the properties of the fabrics will be beneficial for all wearers, but of special value to people susceptible to anxiety and depression. A new branch of medicine, PsychoNeuroImmunology, supports this approach. It studies the brain and the immune system, exploring 'positive psychology' and the connection between emotional stress and the health of the physical body.

Recent research proves that the benefits of fragrance include the balancing of the nervous system, improving concentration, promoting a positive mood, reducing blood pressure that rises during stressful events, reducing heart rate, muscle stiffness, fear of unpleasant medical procedures, such as. MRI scans. (Warrenburg, et al., 2003). The claims also suggest that certain scents significantly benefit people who suffer from insomnia, bronchitis, indigestion and are prone to insect bites. The results of this research could contribute to the reduction of malaria, yellow fever, dengue fever and lyme disease.

Method for experiments

A brooch was designed, fusing microfluidic components, nozzles and reservoirs that dispense airborne nano-litre sized droplets of scent into the air to form a 'scent bubble' around the wearer, so that a coded scent message is delivered to certain areas of the body. The study used an aroma mix with a higher percentage of fragrance concentrate in ethanol. The brooch did not require ethyl alcohol, unlike mass-market eau de toilette that contains 99.7% pure ethyl alcohol (Pybus and Sell 1999). Alcohol has been used in perfumery since the

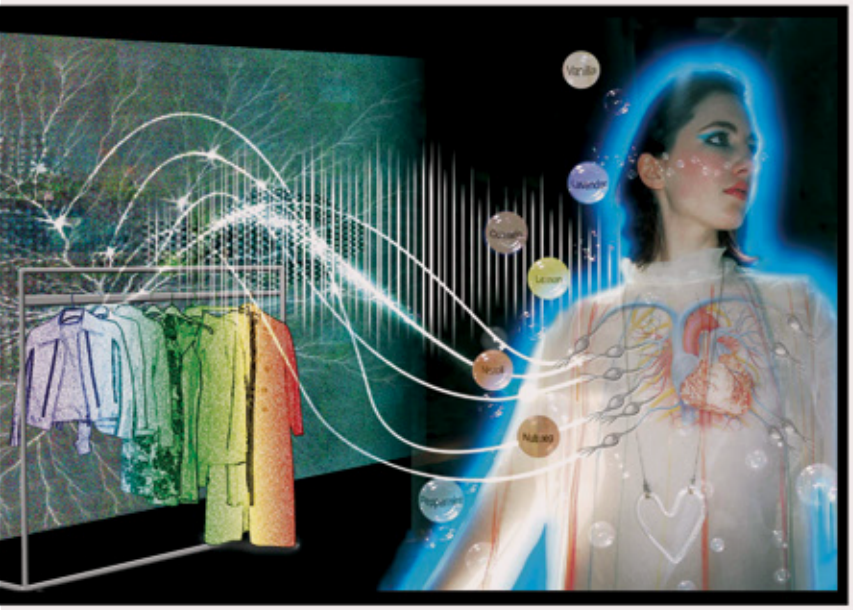
'Heart, Brain & Skin' Photo Guy Hills

18th century as a neutral solvent in preparing fragrances. It is added to the concentration as a vehicle for the oil, modifying its intensity and making it easily applicable to skin. However, human skin was never designed as a vehicle to hold perfumes and alcohol-based perfumes tend to dry it out, causing severe rashes and skin disorders. In this instance the technology described in this paper delivers scent, which is inherently lighter and less likely to irritate sensitive skin.

Scent By A Wireless Web

The technology created for this study has also provided a new way to send a scented message over a wireless network. The 'Scent Whisper' project links a remote sensor in a spider brooch with a fragrance-dispensing unit in a bombardier beetle brooch, to create a jewellery set that constitutes a 'wireless web'. A secret message is 'scent by a wireless web' from the user who whispers into the spider-brooch, which transmits this message to the beetle-brooch worn by a partner. The spider's sensor (which is implanted in its abdomen) records the humidity of the partner's breath and the beetle releases a scent onto a localised area.

There are a number of different applications relevant for scent delivery, utilising the technology described in this paper:



'Wireless Perfumer-Free-Zone' Photo Guy Hills, Illustration Wendy Latham

Responsive environments:

- as an aromatic navigation system for the sensorily impaired
- to ambiently communicate abstract information (such as the status of the stock market) by releasing certain scents when changes in information occur, for example if the market goes up or down as suggested by the 'Dollars & Scents' ambient stock market display research (Kaye 2001)
- to assist odour annoyance in environmentally sensitive public spaces should a user enter a 'perfume-free-zone'. The device would halt perfume release as the user approaches either a person wearing similar clothing or in a space that communicates a person is allergic to certain components in perfume

Medical Healthcare

- as an insect repellent that sprays towards a localised area of the body
- a drug delivery dispenser that sprays Ventolin molecules for the prevention of asthma
- to suppress or enhance appetite through specific odours (Hirsch et al., 2003)
- as a multiple scent output communication tool, allowing for a colodour coding system that delivers a variety of scents from the shoulder strap of a bag to enhance mood and emotional states
- as an alternative to audio ring tones in mobile phones

Scentsory Design Fabrics

This research will advance the future development and functionality of Scentsory Design fabrics, such that they are capable of responding to biological conditions triggered by the body's physical signals. Scentsory Design fabrics will house individual disposable scent capsules that 'click-in' to the delivery system. The fabrics will have the capacity to 'pulse' appropriate scent quantities through micro-tubes that are protected in water resistant polymers and embedded in a fabric membrane, without causing intermittent waste. This will allow the exact amount of fragrance to be delivered, in response to the users state. The fragrance is delivered from an embedded scent recipe palette, eliminating problems related to odour time span and creating an economical system whereby little scent is wasted.

There are many fabric applications that could be developed as a result of this research: for example, clothes that act as a communication tool whilst also offering a 'wellness aura' or a 'scentient screen' for fashion and health purposes. Such fabric research could offer three possibilities depending on the requirements of the user:

1. spraying scent directly on to the skin to contribute towards psychological wellbeing

We are entering a new age of perfumery that could have a radical impact on mental health. Smells engender emotional responses and the raw materials used to create many of them have mood-enhancing effects (Pickthall 2003). Once sprayed directly onto human skin, fragrances can enhance the personality and identity of the user. Each scent smells differently from one person to the other and every scent affects a person in a different way.

Recent research estimates that by the year 2020, depression will be the illness of the age second only to heart disease (The World Health Organization Global Burden of Disease Survey 2005). If fabrics developed for an 'emotional fashion' collection can reduce the need for traditional antidepressant treatments, including their unpleasant side effects such as headaches, insomnia, sweating and agitation, then this research will have considerable social value.

Sleep disorders are extremely common with 33% of the US adult population experiencing bouts of insomnia whilst 9-12% experience chronic insomnia (Ford, et al., 1989). Fabrics that pulse minute droplets of scent throughout the night with properties to encourage sleep could be invaluable.

2. pulsing scent through fabric surfaces and away from the body

Studies at the American Academy of Dermatology suggest that up to 10% of the American population experience a reaction to cosmetics containing alcohol when applied directly on to the skin.

The fabric proposed in this research is intended to replace astringents that burn sensitive skin. The clothing itself will act as a new medium for the fragrance industry to sell perfume. The key, and novel advantage of the delivery system developed for the jewellery is that the fragrance obviates the need for skin contact by solvents. The direct spraying of perfume means no additional chemicals are needed either for evaporation (e.g. alcohol) or for propellant (as used in deodorant sprays).

The delivery will be in response to users' real-time needs, i.e. activated by a variety of body sensors (increased heart rate, galvanic skin response, temperature) or sound (dance music, insect noises, high decibels), communication from other users (symbiotic response), direct user request etc.

3. spraying scent away from the body to create an active mobile barrier

It has been predicted that by 2010 half the world's population will be living in areas where malaria is transmitted and it will be at least a decade before a vaccine for the disease will be readily available (Greenwood 2005). Consequently there is a need to expand on existing repellent control methods. The World Health Organisation currently estimate that approximately 300 million people worldwide are affected by malaria, with more than 120 million clinical cases and between 1 and 1.5 million dieing from it each year. Scentsory Design research cannot look at the treatment of malaria, but instead the disease could be prevented by repelling the mosquitoes carrying the parasite.

Female mosquitoes are attracted to human body odour and carbon dioxide in breath. Ingredients that repel mosquitoes do so by repelling them from the host (negative hedonics), by distributing their ability to find the host or by distributing their ability to feed on human flesh (Warren 1998). A wearable 'scentient screen' that repels mosquitoes could significantly reduce malaria and other airborne insect diseases by accurately targeting the release of minimal amounts of repellent, thereby removing the need to apply copious amounts of greasy sprays directly on the skin.

Conclusion

The Molecule is the message
Our sense of smell is now more widely recognised to be important for our daily life, especially after the recent scientific breakthrough in olfactory reception and the Nobel Prize awarded for Medicine and Physiology in 2004 (Buck and Axel 1991). As a result, a wider spectrum of multi-sensory research will be available to artists and designers. It is clear from the evidence presented above that this research will lead to further development and design implications in fashion, textiles, responsive environments, healthcare and other systems that use smell to convey information. Scent will become a more user-friendly medium as technology allows people to learn coded scent messages, whether they are for wellbeing, communication or simply for having fun.

The results of this paper are a snapshot of scent-output devices in clothing. Further deelopments include combining controlled scent delivery with thermochromic inks to create the colodours effect. In coming years, as more is discovered about olfaction science, there will be room for many beneficial applications in this new and exciting field of Scentsory Design.

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Playtime

Jessica Hemmings

The Dutch designer Maria Blaisse was once described as the happiest artist around. She earned this unusual sobriquet through a working practice that engages with an increasingly rare emotion: joy. Blaisse designs objects that are to be played with and explored – enjoyed rather than agonised over. As a designer her role is not so much that of an inventor as it is that of an enabler, adept at releasing contained energy from existing materials.

Onda: Maria Blaisse in collaboration with Karin Marseille. and Black circles Kuma Guna series 1996 dance performance Studio Bickergracht Amsterdam .

Blaisse explains that her approach to design is "understanding when a product is self-evident, which means that you don't make it up, but allow it to emerge by looking at the qualities of a material with respect, so that shapes arise naturally." Needless to say, "self-evident" in the skilled eyes of a designer such as Blaisse is often the very stuff that eludes the rest of us. Common materials, simple forms and a great dose of ingenuity have earned Blaisse a solid reputation in what is considered by many to be largely uncharted areas of design.

In "Adorned in Dreams" the fashion historian Elizabeth Wilson writes that dress is "the frontier between the self and the not-self." Much of what Blaisse has designed over the past twenty years occupies this nebulous space. Her creations amplify and distort the body, often at the same time. The space around the body – another form of the not-self – is accentuated and activated by the stark geometries she places on the body. Many of these objects

Maria Blaisse allows herself and her audience freedom of expression

are static sculptural investigations as well as dynamic garments or accessories that enlarge, restrict, and extend shape and movement. It is often her most innocuous static shapes that present the most challenging and engaging forms when worn on the body. When static, the objects Blaisse creates are relatively easy to name as sculpture, but when they are understood as dress they are less easy to define. As performance pieces they become even harder to categorise. Photography and video are used to capture this transient research that often involves collaborations with professionals from other disciplines, such as dancers. The resulting designs speak to, and command the attention of, multiple disciplines: sculpture, fashion, performance and prosthetics.

The beguiling simplicity of her forms as well as her engagement with industrial, often recycled, materials aligns itself with a craft sensibility based on haptic regard for the chosen material. Over the years, neoprene rubber, foam polyamides, vacuum moulding and lamination techniques have all found space in her repertoire. As she explains, "The advantage of some synthetic material

is that because it is not beautiful or nice to touch you do not get distracted. This allows you to see something for what it is, completely unadorned." This lack of adornment remains evident even in finished pieces that are striking in their simplicity and control. Even her use of rubber, an organic material, is handled with attention to its plastic qualities rather than the ability of the material to degrade and return to its organic beginnings.

By the mid-1980s Blaisse was occupied with research for the Gomma series. The project began, as many great ideas do, innocently enough – as response to her children's request for fireman hats to wear at a party. Working with the rubber inner tube of a tyre found at home, Blaisse not only fashioned hats for the party, but began research and experimentation with the material that occupied her for years to come. Countless experiments allowed her to isolate the specific tyre inner tube that offered the greatest usefulness to her work. Cutting a variety of simple shapes from the inner tube such as diamonds or triangles presented almost limitless possibilities of positive and negative shape. A combination of flexibility and memory allowed the materials to form around the head, and later body. The tendency of the material to return to its original tube shape offered an energy that could be restricted or enhanced. These early works, like many of the pieces to follow, do not have a rigid orientation. Instead their relationship to the body often takes on multiple variations as is evident in works such as "Flexicap" from 1988.

In New York City Blaisse was spotted wearing the "Flexicap" and invited to work with designer Issey Miyake on a series of hats for his spring/summer 1988 collection. In response to Miyake's linen dresses that season, Blaisse designed hats from pineapple fibre, a material that referenced the linen dresses but offered a supple strength activated by the long sweeping strides of the catwalk models. An investigation that began as a response to her children's request for party hats found its home on the runway. Such leaps of context are not unusual, or surprising, to this designer. Blaisse has developed a working process that is firmly centred on the rigours of her material investigations and tenaciously avoids the distraction of dwelling prematurely on end use.

From her millinery investigations, Blaisse began to consider the body as a whole. A commitment to simplicity remained, while the larger scale and broader investigation of materials resulted in works such as "Spheres", a production for the Stedelijk Museum, Amsterdam in 1989 with dancers from the Dutch National Ballet Company. As her forms grew, dialogue between the wearer's body and the objects gained increasing importance. Collaboration took on a central role and by 1995 Blaisse was producing works such as "Red Circle," an intense collaboration with a single dancer that allowed for an entirely focused exploration of the relationship between organic body and synthetic form.
Larger collaborative explorations followed with groups of professional dancers and accompanying musical compositions often recorded on video and in photographs. It is undeniable that these professionals play a considerable role in realising the kinetic energies of her forms. These concentrated studies of material and flesh are genuine collaborations, with equal input from the muscles, bones and minds of the dancers as the density and form of the adornments Blaisse constructs.
In what represents both a material and conceptual departure and a return for Blaisse, the Onda Collection is a series of knitwear inspired by a piece of seaweed found on a beach in Ireland. In collaboration with the textile designer Karin Marseille, Blaisse has designed a collection of garments based on six basic shapes that theoretically make up one person's entire wardrobe. Unlike previous projects, Blaisse has returned to the materials of her early education as a textile designer. She is also quick to note another difference in this project: the knitted tubes invite, rather than restrict, the motion of the wearer. The similarities this curling knitted form shares with the sliced edge of the inner tube that captured her imagination for so many years have not escaped the artist. It is an inevitable return, which she sees as part of the cyclical and self-referencing nature of design. For Blaisse, the self and the not-self are manifest on numerous scales. They appear in the organic body and its synthetic adornments; the motion of the body and the stasis of space; the performative body and the observing audience; a body moving free of restriction and a body moving under restriction. Perhaps most importantly, the self and the not-self are manifest in the mind and body engaged with play and the mind and body restricted or incapable of play. The designer's dislike for the distancing energy which conventional art museums and galleries often cultivate has encouraged her to pursue alternative ways of exhibiting this work to the public. In 2004 at the Perth Institute of Contemporary Arts in Australia a number of works were displayed on the floor in the central room of the gallery. Viewers were encouraged to handle the objects, playing with the possibilities these shapes offered in relation to their own bodies.

Sadly I, for one, found it difficult to break through the gallery taboo of "do not touch", and to actually feel at ease playing in such a public space. It may not have helped that the first object I chose to touch was apparently the one that the gallery guards were most concerned about protecting, causing a circle of eyes to train on me as I casually tried to dispel the sneaking suspicion that my efforts at playing were probably the least creative they had witnessed all day. Nonetheless, I do not think that I am the only person to concede that I have long lost a part of myself that Blaisse has kept alive. It is the ability to explore concepts and materials without intellectualizing and explaining: the ability to allow time for play. ¶

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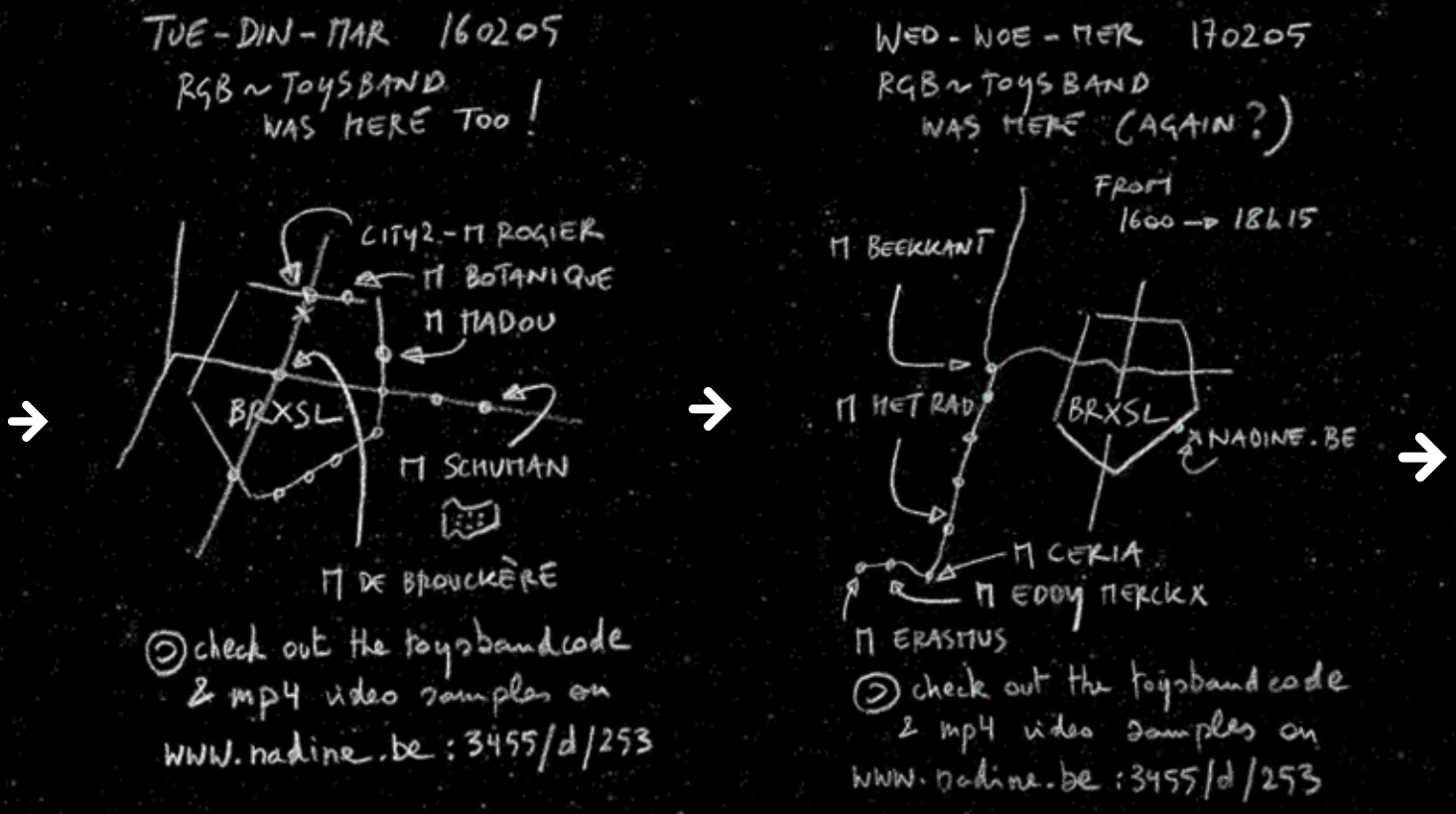
toysband: MANIFESTO

The first toysband ever is not the RGB~Toysband. There are toysbands all over the world.

All musical instruments of Toysband members must be handmade by those members. They are simple electronic devices, synthesizers, mixers, matrices, light-sensors and hacked new or old children's toys. The crazier the better. No pre-made industrial musical instrument may be used, except if it has been thoroughly hacked. There is one exception: speaker-amplifiers to produce the sound of every toy, like the legendary little Radioshack mini amplifier-speakers. Nicolas Collins' Hardware Hacking handbook is the Bible. Nic Collins is Jesus. The performers are obliged to meet to make their instruments together and to compose and rehearse their repertoire. It is a common social activity. An occupational therapy. Toysbands can only perform in public spaces during peak hours, in subways, railway stations, malls, public buildings (like ministries of culture or revenue), etc. The performance place should be a space where the acoustics are acceptable and where the produced music is audible to the passers-by. Rehearsals and tests may be held in a private space. Performances cannot be announced in advance, only afterwards. There are no specific rules to produce music or sound with the toys. Some indications are necessary to keep a kind of homogeneity during the performances: some songs must be practiced thoroughly before the performance, some songs can be improvised and others can cover existing music. During the performance there can be no use of tripods or tables. The toys can be attached to the body of the performer or they can be put on cardboard boxes (from garbage recuperation). The way the performer presents his toys defines his personality. There is no final mix of all played toys (by every member) through a mixing panel (even if it were homemade), as every member of the band produces his own sound through mini speakers or heavier ones if bass sounds are needed. This is to avoid cable spaghetti. There is no dress code for the performers. But wigs are more than welcome. During the performance the public cannot be encouraged to pay any money. If the public gives any financial support, that money should be collected and given to people begging in the same public space.

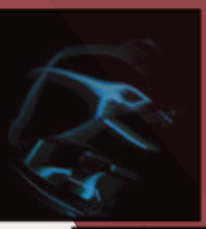
Toysbands can only perform in public spaces during peak hours, in subways, railway stations, malls, public buildings (like ministries of culture or revenue), etc.

Toysband performances never last longer than thirty minutes. We hope they will even be stopped by the local representatives of the law. Toysband is an audiovisual experience. Therefore the only recordings are of sound with image. They are made by video camera and eventually distributed on mpeg-4 video files. Recordings can only be made by a camera woman that has to keep a distance of 15 steps away from the performers. This is necessary so as not to influence the public's view or interpretation and protect the performers' intimacy. CDs can only be distributed as data-CDs with mpeg-4 files. These video files should be downloadable from the internet. Anyone can make a toysband as it is an open source creation. Every new band has to be named by a pre-fix followed by a tilde and the word 'Toysband'. The prefix must not make any sense. No explanation of it will be looked for. All rules from this Toysband code can be reviewed as long as there is a majority of votes from the first Toysband members. ¶

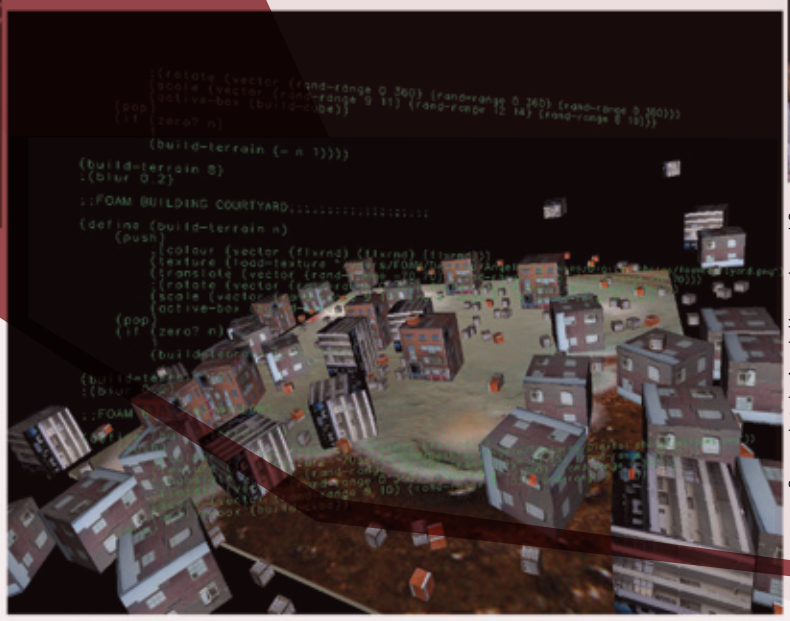


unstable flux

Alejo Duque



From here on the days passed without a pause, learning the code and fantasizing with the different recipes.



Screenshots by Angelo Vermeulen and Guzo

→ Brussels (December 13, 2005)

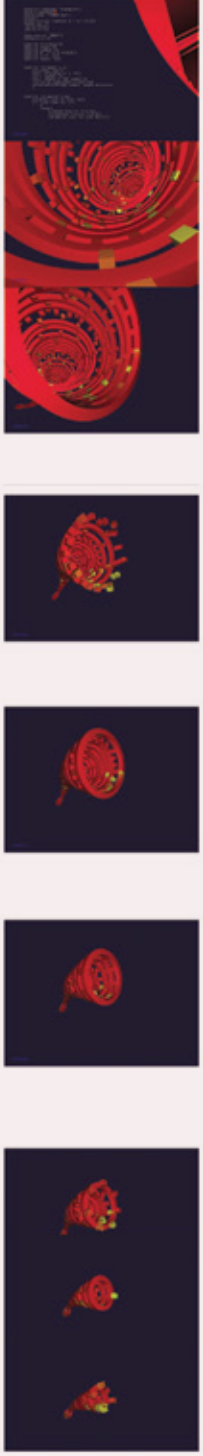
Why is this software called fluxus? Is it one of those coincidences, or am I just creating a system of beliefs to make my experience even more "true" and enjoyable... My answer is, both. Creator of fluxus, Dave Griffiths' answer: "simply because I like the name". Good enough; after a one-year old friendship with this software I feel quite fond of the unstable flow, not only of mind states and ideas, but of volatile 3D forms, altered by user keyboard scribbles, aka live coding. – Live coding is a skill and a practice that gives artist-programmers the ability to change the characteristics of audio and video output on-the-fly, via written commands. In the case of fluxus, the set of commands comes from Scheme – a Lisp dialect – which are interpreted and executed by just pressing f5.

That being more or less the long intro, let's move on to the setting.

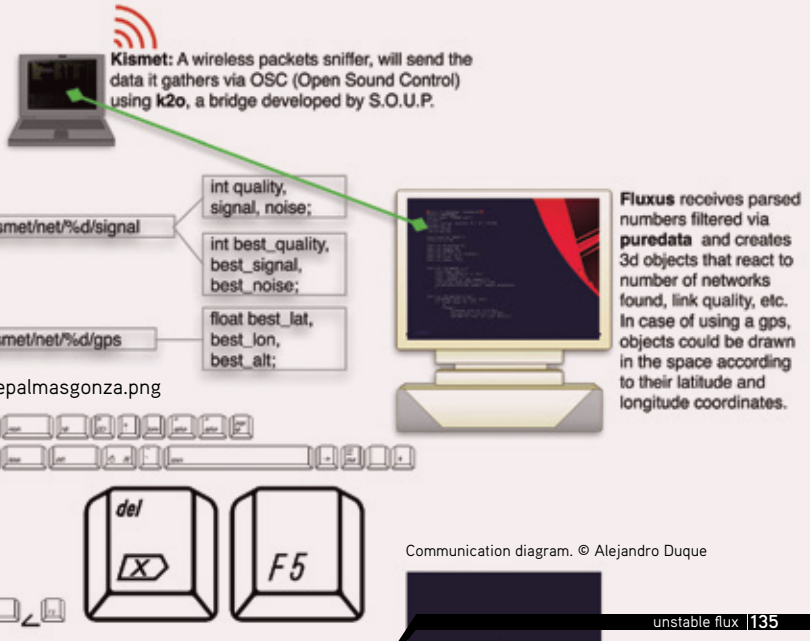
So I came in late due to a stopover in Cologne, chatting with good friends and having too many drinks. On the train (going at 300 km/h) Sigfried Zielinski's inspiring read on "Variantology" – especially the part about John Cage and mycology – prepared me well for what the following days had in store. When I arrived at FoAM (delayed even further in the labyrinth of Brussels, where even local taxi drivers get lost) everyone had already made their informal presentations and I had no chance to introduce myself formally, but there was no need of such protocols, because everyone had an open attitude to whatever Dave and Nik (the workshop leaders) were going to put on the table. Only a few participants had previous coding experience, the rest were there to learn the basic commands of Scheme and to attempt to integrate fluxus into their projects. After the first few hours of installing fluxus, we gathered around another large table where we ate the great recipes that Rasa and Danica coded in parallel, in the same big loft criss-crossed by video projections coming out of our computers.

From here on the days passed without a pause, learning the code and fantasizing with the different recipes. The schedule obeyed a clear pattern. Mornings for theory, the history of computer animation and fluxus tutorials, afternoons for questions and experimentation with the software. Day 1, day 2, day 3... when I got to day 4, the project I planned to do was somehow more clear. I was reminded of a project I have been working on for about a year, which began around the same time I started playing with fluxus. My colleagues and I were war-driving the streets of Medellin, the city in Colombia where I grew up, and visualising the data received from these networks through several applications (see the mapping on: http://co.lab.cohete.net/1mapa+grande_que_el_territorio/avepalmasgonza.png).

During the workshop I had to invest a lot of time setting up the other two applications I wanted to use (pd and k2o) for robbing the air spiced with many wireless packets, that managed to get to the table where I had been working during that week. I worked out a small project in which I made a visual representation of wireless data. I presented it to the public gathered around my computer on the last evening of the workshop. While I was sipping cocktails and explaining my work, the software and hardware were busy churning out colourful worms in response the thick wireless clouds forever brooding over the FoAM studio. ¶



Screenshot from the result of several days in the fluxus workshop, in collaboration with Julien Deswaef © Alejandro Duque and Julien Deswaef



Communication diagram. © Alejandro Duque

http://co.lab.cohete.net/1mapa+grande_que_el_territorio/avepalmasgonza.png

[about .x-med-k. erik's impressions]

Erik Parys

I learned about and learned to appreciate several things during these workshops:

The world of visual programming, as it is called. Programs like Max/MSP and its open source counterpart, PD. Although at first pretty difficult to understand (Max workshop), repeated Hands-On and Goal Oriented Collaborative Experience (henceforth called HOGOCE – each use of this term earns you 3 xmedkredit points) during the two FoAM workshops and the output project have allowed me to feel comfortable within this strange universe.

So, what's Max? I've found it's pretty difficult to explain to people who know nothing of Max exactly What It Is. It's basically a set of objects (which are, in fact, little virtual machines that can do things with numbers) that can be controlled and adjusted by a set of object-specific parameters (more numbers); and all these objects can then be ConNecteD (henceforth CND; 1 point) to form one big machine or 'patch'. Since everything inside a computer is made up of 1s and 0s (how many times have you heard that one before?), including sound and video and texts and what not, all these things (data streams) can be sent through the objects and analysed, controlled, divided, multiplied, CND, transformed, abused, all in real time. The scope of possibilities really is endless and depends entirely on the whims and the perseverance of the programmer.

For example, in the excellent Responsive Environments workshop, Nik, Agnes and I made a patch that:

1.Took in a video signal coming from a webcam installed inside a cocoon-like sofa. It converted this video into a matrix of numbers between 0 and 255, each number representing a pixel (but maybe you don't need to now all this).

2.Divided this signal into 9 little screens, so that the whole filmed area could be analysed per section.

3.The values of the pixels of the current frame were continuously subtracted from the ones of the previous frame, meaning what was left was the difference between frames, meaning that whatever MOVED turned white and what didn't remained black.

4.So then we could take the average amount of difference per section, in other words the sum of all the numbers resulting from the subtraction (where no difference, e.g. 156-156, equals 0), or in other words, the amount of movement that would occur within each section, and have this data CND to something else. *** ok well, I just realized this might be called a basic in understanding Max: everything can be seen as either images or sound or whatever AND at the same time as a set of JUST PLAIN DUMB NUMBERS, which can be used for anything you want. (not sex. Unless?)

THERE. I nailed it. Enough about Max.

Another thing I was quite happy to learn about was the concept of Open Source. I won't go into detail here, because I wouldn't know who'd benefit from such a thing, but anyway, it has changed my views on software and I've certainly changed a few programs on my PC. Yes indeed, I'm writing this text in Open Office instead of a cracked version of Word (out of principle), and I'll be sending it soon using Firefox instead of Internet Explorer (because it's far superior).

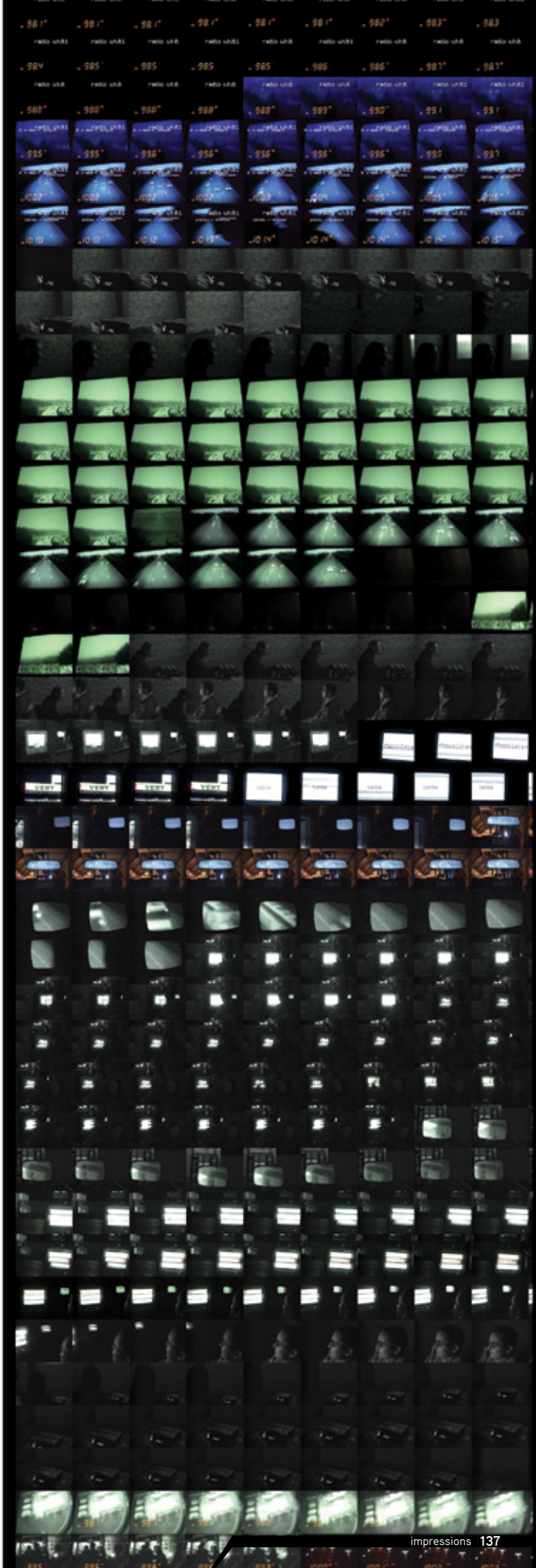
Yes Sir, .x-med-k. has changed half of my life, praise the Lord!

I also had a lot of fun during the hardware hacking workshop. While patiently soldering circuit boards to make things like fake digital amplifiers or light-sensitive tone generators (something I had never done or dreamt of doing before), I could occasionally feel my spirit being invaded by a deep peace, a sense of warm and cosy contentment. I swore to myself I would buy a soldering iron and keep hacking for the rest of my days.

Of course, I never bought that soldering iron and I haven't touched any electronics where the sun don't shine ever since. Which brings me to a question I imagine some people would want to ask: how am I using the knowledge offered by the .x-med-k. workshops in my own work?

All except one of the workshops dealt with technology and ways of conceiving art that I had never practiced before. And in fact, the way in which these new possibilities will integrate in or overthrow my habitual working methods is not at all clear to me at this point. I think these things can only be judged one work at a time, and as far as that goes, I am at the time of writing this working on the video installation for the .x-med-k./nmt output presentation. Which means I'm patching a lot in Max, and enjoying it. And in fact enjoying the possibilities this bizarre activity has for the resulting installation.

Frames from video by Erik Parys and Pablo Diartinez



Apart from this project, I am developing many others for the near and not-so-near future, but none of them are in any way centred on the new skills I have acquired. However, there's bound to be some influence, sooner or later in a concrete form. After all, I'm spending about half my days with my PC, and I've changed my view considerably about PCs. Yes Sir, .x-med-k. has changed half of my life, praise the Lord!

For me, that was the beauty of it, actually. To get to know a lot of things that are very interesting, but you don't know if you're actually going to use them later, you just enjoy doing them at the time. That way the knowledge kind of loads in the background, and now I often find it's just become something integrated in myself, and it makes me see things in different perspectives.

This doesn't always have to apply to technology. Perhaps the most valuable experiences I had during the workshops were in the Media Worlds workshop and the Responsive Environments workshop, which were very HOGOCE. Apart from learning new tools and disciplines, they were centred on making a collaborative installation and making it work within a week. The participants were entirely free to decide on the contents of the work, evidently within the restrictions of the available (and unknown) tools. For me they were highly educating and enriching experiences of teamwork; handling a legion of complicated problems as a group, how to keep being realistic and working hard and truly enjoying it at the same time. I'll say it again: HOGOCE! HOGOCE! **HOGOCE!**

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[about .x-med-k. - pablo's impressions]

Pablo Diartinez

>intro<

I couldn't avoid ending up doing this series of workshops. Even though I'm already saturated with work and projects, the programme looked just too good to be true. It was so full, so structured, and so coherent that I even decided I would follow them all without exception. Of course, we all know that we mostly achieve only half of what we plan, at best... and in the end the programme was indeed too good to be true: in fact it was quite over-ambitious. I could speak as much of disappointments as of great discoveries, achievements and surprises. However, I don't intend to get lost in the small stuff, but rather to give you an insider's view of the .x-med-k. programme of workshops.

>the workshops<

Most workshops gave just a hint how to start up on a very concrete area, an introduction to technologies you could only master by constant and arduous later work. Depending on your background, this introduction could be totally useless to you, or totally surpass you, as it was never possible to cover more than half of what was originally intended, and totally personalized attention is never really possible in this kind of workshops. Actually, rather than acquiring skills in the workshops, I gained awareness of the existence of such skills and the possibility of getting to know them. That is, in my own case, I started the series because I knew I had some lack of expertise in certain technical areas I would need to cover. Now I know I don't want to cover most of these deficiencies because they require a level of specialization I would rather pursue in other areas.

This is not to say I haven't learned a thing, quite the contrary. We had some excellent tutors that made me do stuff I never thought I could do with so little preparation (difficult to single out one person, as the teachers were excellent in general). And new software/hardware keeps getting easier, cheaper and more powerful all the time, and knowing a bit allows you to do a lot. It all depends on how deep you want to go into the rabbit hole. And if you really want to reach Wonderland, then the best is to team up. In fact, many of the tasks I managed within the workshops were only possible either thanks to the directions of the tutor, or thanks to the collaboration with the specific group of people working together.

Many new media works are complex enough to be only made possible by collective effort (and a reasonable budget), as is the case for many audiovisual works (movies). Of course, in a team of specialized people, it is absolutely necessary to understand the role and difficulties of each person involved, and this is why the workshops where so interesting, because they afforded a 'behind the scenes' view of new media, a chance to peer into the world and the frame of mind of the people working on the 'hardcore tasks' of programming and designing interfaces and interactivity models. And what a view!

>the world of new media<

New technology implies new language, new perception of the world, and new possibilities of action and expression. They allow for further evolution. People specializing in new technologies are 'futants', they envision a new kind of mutated people in a new kind of future world. Needless to say, if you don't speak their language, you soon feel as inadequate as a savage in a business meeting. Giving the savage a suit, a pen and a notebook will not suffice him to understand the state of mind of business people. He'll need to learn their language, background, context and motivations.

I had a hard time learning 'new media language' but I had a harder time getting to know the background and context and just understanding them. And the funny thing is that I thought of myself as a new media artist as well... while I was clearly an outsider: Me, the savage man. But how was it possible to be an outsider to new media art and a new media artist at the same time? Was I not? Where was the missing link? And naturally the workshops answered this. New media works were the result of experiments, made by a 'heterogeneous group of artists and technologists working together towards a common goal ...', quoting from the presentation of the first FoAM workshop in the .x-med-k. series. This little quote contains an essential issue: new media 'artist' and/versus new media 'technologist'. In this difference lies a conflict that surpasses the aspirations of this text, but that can clearly illustrate the complexity of the context of new media.

In truth, artists have always been skilful technologists. There is a technique of drawing, of painting, of sculpture, requiring a balanced knowledge of geometry, perspective, optics, anatomy, chemistry, etc. What creates the difference between the artist and the technologist is not the kind of technology or degree of specialization, but rather the context of the application of the technology, the intentionality and motivation of the author. And if we see a difference in new media heterogeneous groups between artists and technologists, it is because we see groups that have different backgrounds and motivations. It is because there are two (at least) different paradigms of art conflicting with each other. Technologists hold their own canon of (new media) art.

>new media artworks<

Of course, if we were to imagine a picture for a canon of the new media in the likeness of the old one of Leonardo, its face wouldn't be that of a man, but of a machine. It is because of new technology that we speak of new media, it is because of machines. And when you look 'behind the scenes' of new media art, you realize that new media artworks ARE machines. Machines with different interfaces and utilities, but essentially machines. This already defines another essential issue: machines have a mechanical function, that is, they 'work', they 'perform' a function. In this case, the function is to interact with an audience. As such, new media artworks are performances; essays, experiments or simulations of machines performing for a public.

These works are somehow the experimental materializations of current hypotheses about artworks in the future, about the future of art, but ironically they answer (yet again) to the old context (cliché?) of the artist (/scientist) who by becoming the creator assumes the role of god. The thrill, the motivation, is the technical achievement, it is to see how organic

and complex the new machine can be; it lies in pushing the boundaries to see how far we can go this time. The artwork is the experience of contemplating the performance of the machine, it is this fascination that allows the interaction between the work and the public, and within this context, the 'contents' of the performance have become secondary. What is important is that your machine, say, your 'robot' achieves singing, not what it sings. The song is meaningless compared to the fascination with the technical accomplishment; it is only relevant as a manifestation of it. In fact, in such context, it is pointless to see the song as something different from the singing, the form as different from the contents.

This is the nature of most new media artworks I've encountered. And naturally, looking at them from my art paradigm, I was nearly always quite disappointed in them. I kept looking for the seemingly absent communicative intent, absent contents, absent expression, absent author/s. To my surprise I kept finding out that such ideas as artistic or communicative intent, or expression of an author were regarded (with manifest distrust) as romantic, outdated and pernicious ideas by many 'technologists'. New media art can be an environment quite hostile to artists! But, the conflict 'technologist versus artist' is partly a correlation of the conflict 'performance versus product' and of the context within 'performance equals exhibition of a technical achievement'. There's a new field for dialogue and collaboration once both sides realize this, and many possibilities to explore.

›experiencing new media‹

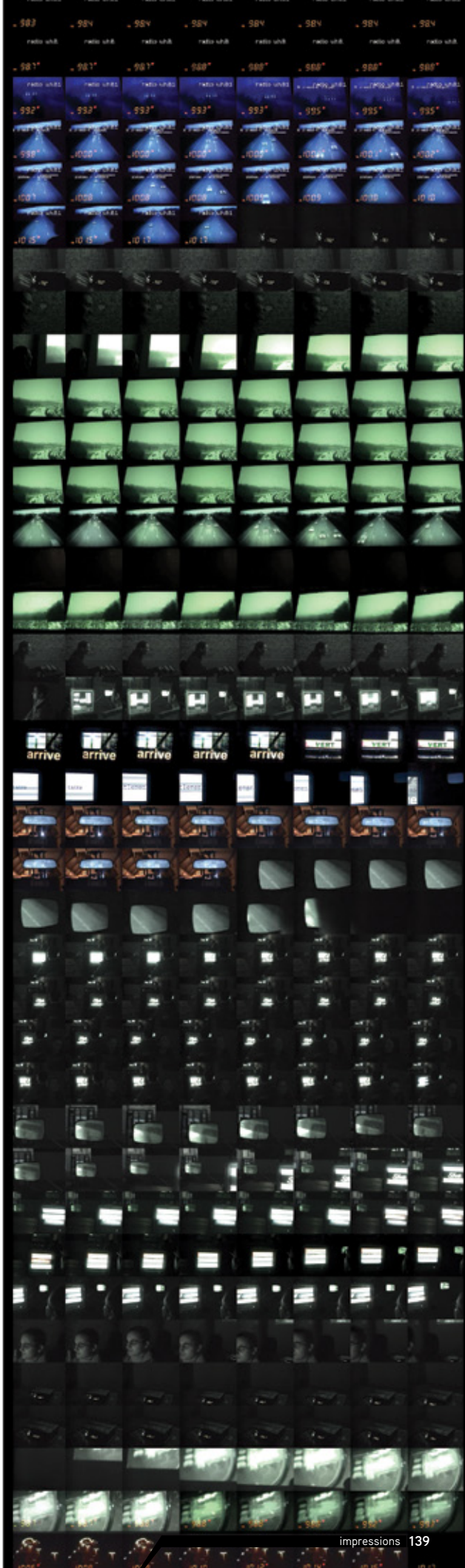
New media is still a laboratory, we keep trying, and we keep being fascinated by the possibilities and often disappointed by the practical results. If the accent on new media works remains on the technological achievement, this process might go on forever. The development of this language can not be solely dependent on the development of technology. Somehow it's like cinema being only able to justify itself by new achievements in special effects. The accent needs to shift to the experience of the audience.

And this is exactly what good, interesting new media works are indeed pursuing, even though it is not always so obvious for an outsider to the field. And in many of these works, experience is defined by interactivity; the artwork is the design of this model of interactivity. There is a very delicate balance to achieve in order to create fulfilling works from these bases. Some interactivity models are so intricate that the users do not understand the way they interact with the machines and others are too simple to build up interest. Furthermore, if the responsiveness in itself is the only goal, the interest of the interaction disappears soon after the mechanism is understood.

As such, there are two different objectives here to achieve simultaneously. On the other hand, the audiences need to understand that they are interacting with a machine, with a system, they need to see it and to experience it. The interface should not mask reactions, operations that are fundamental to the interaction with the user, operations that define the performance of the machine. There is an accent that needs to be given to the machine. The experience of the performance/interactivity should be interesting to the audience at a sensorial/tactile, aesthetic, intellectual or emotional level, preferably at all these levels at once. When this multiplicity is achieved, we have works in which form and contents are the same thing, in which the interaction with the machine shapes and defines the communicative/artistic intent. I find that an invisible/unintelligible system/interface is as bad a solution as an intentionality invisible/unintelligible content/communication towards an audience.

›conclusion‹

This is the main thing I've learned in the .x-med-k. series of workshops. And I must say I'm quite satisfied, or more accurately, relieved to have understood this context. For experienced practitioners, this might be an obvious issue they deal with in every experiment. But these are not at all obvious matters for artists working for the first time in "heterogeneous groups of artists and technologists", and if these questions are not addressed and debated, acquiring skills is actually pointless, and being motivated to acquire them is quite difficult as well. I assume that's why the programme also included a series of lectures/conferences about the history and theoretical context of new media. It's a pity that precisely this was part of the other half, the 50 percent of aspirations that isn't possible to accomplish in the end. I still think the programme of the .x-med-k. series was perfect (full, structured and coherent) and as such it is a shame that (probably logistical) circumstances didn't allow for it to be completed in the full over-ambitious extent of its aspirations. May it be continued. **Long live .x-med-k.** ¶



Frames from video by Erik Parys and Pablo Diartinez

Technology and capitalism are not mutually symmetric

Nematode worms and dust mites will go along with Las Vegas and the Vatican

there are other things that need doing, and one of these is the development of an imaginary of technology, an

If we allow ourselves to make something new, it had better be different.

let's change what we have the power to change

understanding of its poetics

Illustration by FoAM. Incorporating images of e-waste © Empa, Switzerland.

about FoAM

FoAM is a laboratory for the propagation of lived and living experience. We are looking for processes, moments and situations in which experience can be freed from cultural, economic or historical biases, allowing participants to absorb fresh stimuli. We work on a plethora of trans-disciplinary experiments with emerging cultures and technologies.

FoAM's collaborators spend most of their time in the murky spaces between the physical and digital, scientific and artistic, natural and technological worlds. We inhabit these spaces to research and develop responsive environments, active materials, generative media, culinary performances and other entangled forms of contemporary creative expression. Guided by our motto "grow your own worlds", artists and scientists work in colourful teams, scavenging far and wide for relevant scientific, technological and social innovations, fusing them into seeds for imaginary, yet tangible worlds and planting them in the cracks of everyday life.

Where we came from and where we're headed

FoAM originated in the minds of its founders in the late 1990s. As practicing artists and technologists scattered around Europe and Australasia, we found the need for an entity that could mediate between the artistic and the scientific worlds, between (rogue) individuals and (more or less) established institutions. In early 2000, a private research institute in Brussels offered us the opportunity to investigate the feasibility of such an operation. We set up FoAM as a cultural department within Starlab, the institute where a peculiar brew of sciences, humanities and design disciplines were deployed in the research of Bits, Atoms, Neurons and Genes (BANG). In 2001, FoAM became an independent association in Brussels. In 2002 a new cell was opened in Amsterdam. With the core team of five people, together with a network of approximately thirty partners, we operate on the cusp of research, development, presentation and reflection of contemporary creative practices. Since 2004 FoAM has positioned itself as the only Flemish 'Hybrid Reality Lab', with a primary focus on the field of hybrid reality (technologies, media and materials entangling the physical and the digital).

Cooperative cells

The organisational structure of FoAM is networked: we operate as cells with several partner organisations, associated artists and scientists, distributed around the globe. We are a small and flexible initiative with many international contacts, able to fill the gap between larger (scientific and cultural) research institutions and individual artists (or artist collectives). This structure allows us to realise larger projects, while keeping the flexibility of a small artist-lead initiative. We consciously decided not to grow into a sedentary institution, but to focus on establishing sustainable (and adaptive) relationships with a growing network of partners. This type of structure has conditioned our extensive experience with setting up and implementing interdisciplinary collaborative methods, as well as coordinating remote teamwork through CSCW/CSCD tools. Our aim is to foster transdisciplinary research in the field of hybrid reality, through long term initiatives, international co-productions, thematic study-groups, as well as through documentation of our work in publications. In order to open our research to a variety of audiences, we continually explore new public contexts for our various fields of inquiry, which generally abide in between disciplinary boundaries.

{4M+0}Real

Our activities are grouped in 5 main thematic fields: macroReal (Reality), metaReal (Consciousness), multiReal (Community), microReal (Substance) and zeroReal (Life). The results of our projects usually encompass more than one category, and if truly successful, all of them. Most of the work and play at FoAM are process-oriented, engaged in a continuous dialogue about the consequences of our present actions. Throughout all our activities we work towards harmonising the relationship between ecological, cultural and technological developments. Rather than creating yet another series of over-designed, unnecessary 'cultural' artifacts, we have committed ourselves to consciously develop and deploy the arts, sciences and technologies for the wellbeing of a prospective world.

"... active exhalations work together, not to bring about some hypothetical fusion of individual beings, but to collectively inflate the same bubble, thousands of rainbow-tingled bubbles, provisional universes, shared worlds of significations." - Pierre Lévy

¶

what is FoAM?

foundation of active morphing

formulaic osmotic application misplacement

foundation of aesthetic machinery

formal osmotic adaptive music

foundation of augmented media

fluctuation of adaptive morphology

foundation of aperiodic mesmerism

fluid organic advancement magnetics

focus of adaptive magnetism

foundation of aesthetic mutation

foundation of affordable melting

further osmotic aperiodic mobiles

fertiliser of aperiodic mesmerism

fluid of applied melting

further organic aperiodic misplacement

fungus on applicable marmalade

further osmotic application merging

foundation of affordable mysticism

other: f... o... a... m...

http://fo.am/

mailto:info@fo.am

own worlds

participatory and critical ap

about iMAL

iMAL (interactive Media Art Laboratory) is a non-profit association created in Brussels in 1999. iMAL was founded by individual artists, media producers, interactive designers, software engineers, and by NICC (a Belgian association of visual artists) with the objective of supporting artistic forms and practices using computer and network technologies as their medium. iMAL provides opportunities for experimenting and producing media art projects, either through residences in the lab or through creative workshops.

Besides production and education, iMAL maintains a laboratory and an artists' workplace with a resource centre (equipment, documentation) and organizes various public activities in the field of digital culture, such as exhibitions ("CONTinENT" in 2000, "F2F" in 2003, "Infiltrations Digitales" in 2004, "openLAB" in 2005), concerts and performances, in order to create critical, interdisciplinary encounters between the public, artists, technology and society. iMAL works on three axes: creative workshops and the lab (the process), European or international collaboration (the network) and public events (the creative, participatory and critical appropriation by the public of technology in the context of the information society). iMAL is structurally supported by the Communauté française de Belgique and occasionally by the Vlaams Audiovisueel Fonds, the City of Brussels and the Brussels Region.

History: CONTinENT and the Finnish attitude

In 1999, we initiated our very first project, CONTinENT, in the framework of Brussels 2000 and Helsinki 2000 (cultural capitals of Europe for the year 2000). CONTinENT was a collaboration between Helsinki (with Minna Tarkka, professor at Media Lab, University of Art and Design, who then founded the m-cult association), Paris (with Jean-Louis Boissier, artist and professor at University Paris 8 and ENSAD) and Brussels (Yves Bernard, iMAL). CONTinENT was structured as a one-year creative process for about 20 artists to prepare an exhibition to be shown simultaneously in Brussels and Helsinki in September 2000. French and Finnish artists came to Brussels for working residences throughout 1999 and 2000. Belgian participants were young technology-oriented artists from Brussels and also some recognized traditional-media visual artists such as Franky DC, Michel François, and Alain Geronnez, with the proposal that they could explore computer-based forms of expression. The CONTinENT exhibition proposed about 20 new media art works: web projects, CD-ROMs, interactive installations, and performances. Many of them continued after September 2000: Michel François and Alain Geronnez's projects were published in 2001 and 2005; Franky DC's Objects of Transfiguration were recently exhibited at Eyecontact, a retrospective of the artist at SMAK (Museum of Contemporary Art, Ghent, April 2006); Erik Andersson has performed World Wide Chocolate Heart in Brazil and other countries, Tuomo Tammenpää has continued to refine and exhibit NEED internationally, Mia Makela has shown Passenger at various festivals...

CONTinENT taught us a lot about the whole field of computer-based arts, about producing "new media" art and how to present it to an audience. The Finnish input was considerable and the Media Lab at UIAH (University of Art and Design, Helsinki) was at that time an example of both interdisciplinarity and educational methodology, an example of a pragmatic and complex-free approach to the creative appropriation of technologies, a type of structure nonexistent in our country and impossible to set up in the rigid, conservative, and underfunded Belgian arts education system. It became obvious that we needed to create our own dynamic educational, critical, and exploratory processes targeted to all those artists willing to explore computer-based arts. So, we decided to organize both intensive workshops and public events, which eventually merged into a single activity.

Public Encounters in Open Contexts

In 2003, we invited to Brussels the "F2F new Media Art from Finland" exhibition after a long tour through the US and Canada. F2F Brussels was a new version with new works coproduced by iMAL: "White Square" by Hanna Haaslahti with Yves Bernard, and "Brand Body" by Tuomo Tammenpää. The exhibition was original in its content but also because of the building where we decided to hold it: the "Cité Administrative" in the centre of Brussels, a huge state office complex from the 1960s with an uncertain future, but still at that time daily populated by thousands of office workers: our goal behind this decision was to provoke an encounter between new media arts and another public than that of contemporary art galleries or specialized electronic arts festivals. The exhibition was a success and in 2004, we organized "Infiltrations Digitales", an exhibition featuring local and international artists (e.g. Scott Snibbe), with a series of nearly 20 concerts and performances by Belgian, European, and US artists. Again, the place hosting "Infiltrations Digitales" was carefully chosen: the great Vanderborght building, in the very centre of Brussels, which hosted Brussels 2000 and CONTinENT. This large functionalist building, nearly abandoned in 2004, was occupied by iMAL and two other organizations, "Komplot" and "Boups". "Komplot presented contemporary art exhibitions and performances, while "Boups" organized electronic music events, DJ-sets and parties. In this unique venue, our collective programme became exposed to an alternative audience.

Interdisciplinarity and Connected Spaces

"New media" is an obsolete expression. Technology is everywhere in our daily life and percolates through art disciplines: dance, theatre, cinema, music, visual arts,... Media arts, i.e. arts based on technology, seem to be the arts of our time. Will the specialized field of media art slowly melt into the contemporary arts, or will contemporary arts become more and more technology-based, by integrating their original specificities such as computation and executable formalization, interactivity, networks, simulation? iMAL is increasingly exploring these questions through interdisciplinary projects, many of them initiated by traditional artists. For these artists and for us, the confrontation with computer-based languages and tools certainly is an enlightening process of exploration of the specificities of media arts.

The conditions of the experience of technology-based artefacts by the public is radically changing: the public space, the city, the networks have become the predominant spaces for experiencing, participating in, playing with... these created objects, processes and platforms (museums and art galleries are no longer the prime venues). Researching and experimenting with these new forms of artifacts deployed through connected spaces of different natures is one axis of our activities.¶

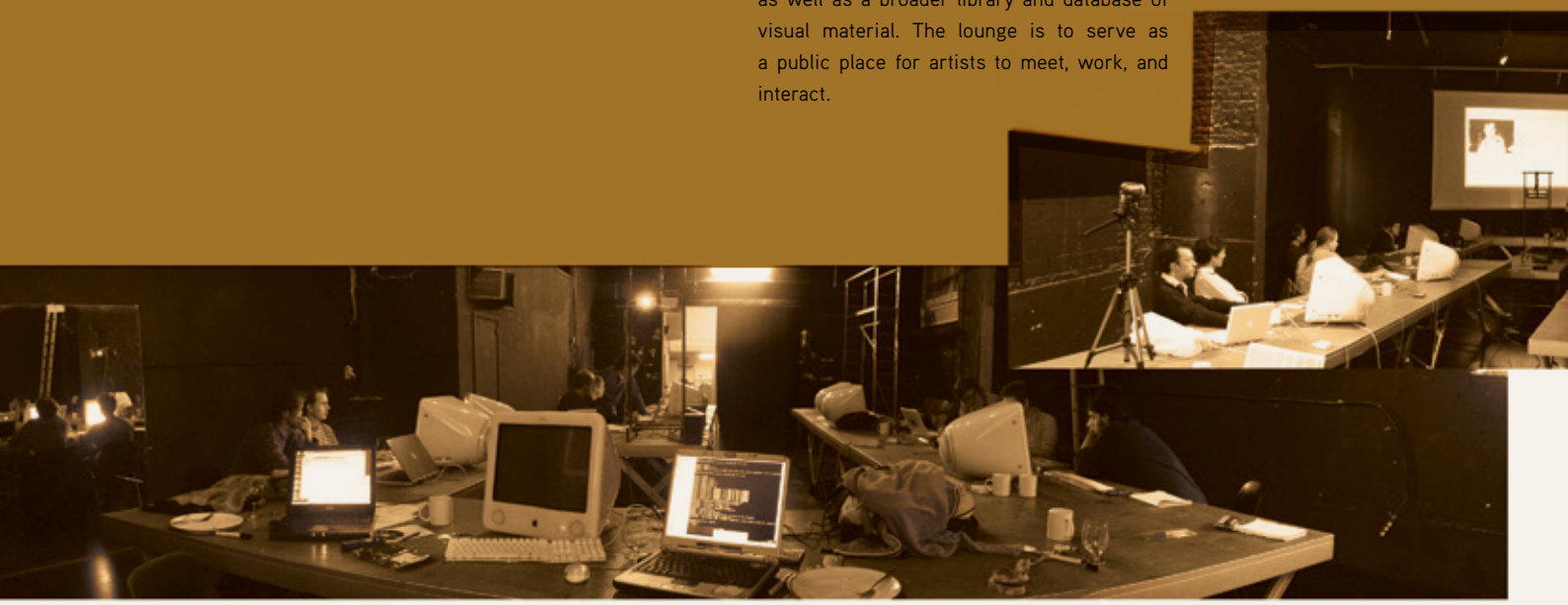
http://www.imal.org

about nadine

nadine *is an artistic laboratory and consists of two venues,* ***PLATEAU*** *and* ***TANI****, each with its own character:*

PLATEAU provides for longer periods of two or three months' research into a central line of questioning. Collaboration between artists, scientists, and theoreticians form the basis for the exploration of possible methodologies to generate responses to the issues concerned. The focal point of these projects can be theoretical, practical, or technical; for instance, a group of artists and computer scientists may work together on new tools for data processing. Or theoretical frameworks for international networking. Or new models for collaboration beyond individual disciplines. Each project is be accompanied and developed by the *nadine* team together with the participants, resulting in a publication and DVD situating and making accessible the research process. These can in their turn serve for continued investigation of the original question.

In addition to housing these longer-term residence projects, the front space in PLATEAU is equipped as a lounge affording permanent public access to the archive of *nadine* projects as well as a broader library and database of visual material. The lounge is to serve as a public place for artists to meet, work, and interact.



TANI is being developed as a venue geared towards new media specifically and put at the disposal of related organizations as well. By providing professional equipment for filming, recording, montage, projection... *nadine* wants to fill a void perceived in the area of testing and developing new media applications for the performing arts. The TANI black-box studio will be equipped with blue key / chroma-screen, professional camera and projector, as well as project-specific material. The adjacent room is available for new media workshops and exchange. ¶

http://www.nadine.be

It is a structure you dream up and try out.

about okno

the official story.

okno is a Belgian non-profit cultural organization, officially recognized and supported by the Ministry of Culture. The organization functions as a platform for several real and virtual initiatives that work within the area of technological arts in the broadest sense.

Since 2003, **okno** organizes conferences, workshops, exhibitions and performances.

The themes are mainly: code and algorithms, communication systems, ecological and technological art.

The presentations are experimental, and demonstrate a process-driven or research approach within the domains of technological art and culture.

the real story.

An organization is a concept. It is a structure you dream up and try out. You want to see if it could work out. Most of the time organizations are used in a consolidating way. The more they become an administrative reality the more they abandon their experimental aspect. They are there, but live out their administrative reality, instead of their unfulfilled dreams. Within their structure, there is no compulsion to keep up the change. They don't act in society anymore. They either stop existing, are abandoned, or are forgotten.

Nevertheless, one needs an official legal basis to receive recognition and support from government, so we began to think about tweaking the system in a direction where we would not be occupied with too much administration and still remain open for change, experiment and innovation. And so we started an umbrella organization. That is how **okno** was born. And the first thing we did was buying a server, with a good up- and downlink connection. That is what we thought organization could be like.

the collaborating collectives :

• **so-on** , a collective composed of artists, curators and theoreticians. Since 1998 [formerly LookingGlass], the organization has built up an international reputation in the sectors of production and presentation of interactive installations, performances and lectures relating to innovation and new media in a visual arts context. In recent years the focus has shifted towards network projects and sound art. Within **okno**, so-on takes care of the production and presentation of technological art projects, publications, and communication policies.

• **code31** organizes regular open workshops attracting local and international artists, programmers and engineers. These meetings make up the breeding ground for technological arts projects for which international connections are of utmost importance. Code31 is responsible for creation and development within **okno**, and for server management including streaming infrastructure.

• **mxhz** has for years been active in non-conformist projects involving artbots, networked and audiovisual performances, publications, and presentations. It is an open virtual organization doing research within an international, productive, artistic network. Within **okno**, mxHz.org takes care of research and international networking. ¶

- http://okno.be
- mailto:steklo@okno.be

- http://so-on.be
- http://mxHz.org
- http://code31.lahaag.org

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biographies

authors, editors and other contributors

gert aertsen/code31 holds an MA in fine arts. Since august 2001 he is part of mxHz.org (machine cent'red humanz), a multi-disciplinary collective of artists exploring the different fields of technology, arts and experimental music. In April 2003 he founded Code31 together with Pieter Heremans & Hendrik Leper. Code31 is an open studio for research, development and discussion about techniques and methodologies in media-art. Gert is co-founder of **okno**, together with Guy Van Belle and Annemie Maes.
lahaag@mxhz.org,
http://code31.lahaag.org,
http://mxhz.org,
http://lahaag.org

nicolas d'alessandro holds an Electrical Engineering degree from the Faculté Polytechnique de Mons, (be). He did his master's thesis in the Faculty of Music of the University of Montreal. He researched the development of an application based on perceptual analogies between guitar sounds and voice sounds, and did a study of mapping possibilities between gestures and speech production models. Today he's working on a PhD thesis in the TCTS Lab of the FPMs, related to the real-time control of NUU-based (Non Uniform Units) synthesizers. He is currently in charge of the MaxMBROLA and MBROLA projects.
http://tcts.fpms.ac.be/~dalessandro/
http://tcts.fpms.ac.be/synthesis/maxmbrola/news.php

bartaku (96˚; aka Bart Vandeput 70˚). Background in communication science & drumming. Installation work, interventions & experiments combining/opposing threads, images and sounds using electronics, digits, drills and other spinning tools and toys.
bartaku@yahoo.co.uk
http://recuerdas.blogspot.com

guy van belle/mxHz.org has been prominently involved in the use and development of media for artistic purposes since 1990. Since 2000 he has been working under the name of xgz in the collective digital band mxHz.org (machine cent'red humanz), creating collaborative performances, concerts, workshops, exhibitions and unexpected experimental/abstract art projects. He is working across Europe, with a primary focus on 'areas of transition' in South, Central and Eastern Europe. His streaming workshops have resulted in the establishment of active new networks among artists, institutions and cultural activists. With Akihiro Kubota he started the 'Society of Algorithm' in 2001, working on net-based music performances. He is co-founder of **okno**, together with Annemie Maes and Gert Aertsen.
xgz@societyofalgorithm.org
http://mxhz.org
http://societyofalgorithm.org

yves bernard completed his education in architecture and software engineering. He worked as a scientific researcher for 10 years focusing on Computer Aided Architectural Design and then at Philips Research Lab on user interface design and multimedia authoring tools. In 1994 he founded Magic Media, a new media studio where he realised and produced art & culture cd-roms for publishers such as Gallimard, Hachette, Grolier, Réunion des Musées Nationaux (many were awarded, eg. EMMA 1995, Milia d'Or 1998, Grand Price F@IMP/AVICOM'99). In 1999, he co-founded the association iMAL and he is currently its director. He co-curated 4 new media art exhibitions in Brussels and Helsinki. He was the engineer, interaction adviser and author for about a dozen interactive installations, net art projects and videos exhibited internationally. Yves teaches computer-based arts in the ERG art school.
http://www.imal.org

joanna berzowska is Assistant Professor of Design and Computation Arts at Concordia University in Montreal. Her research work deals primarily with soft computation: electronic textiles, responsive clothing as wearable technology, reactive materials and squishy interfaces. She is the founder of XS Labs (Extra Soft) in Montreal, where her team develops electronic textile and reactive fashion projects such as Memory-Rich Garments. She is also Director of the Interactive Textiles and Wearable Computers Axis at the Hexagram Institute. She received her Masters of Science from MIT for her work titled Computational Expressionism. She holds a BA in Pure Mathematics and a BFA in Design Arts.
joey@berzowska.com
http://www.berzowska.com/

agnes brewer studied visual art in Vienna/Austria. Video, photography and installation works, web-design, works with old and new media. Agnes tries to figure out how all the puzzled pieces belong together.

maria blaisse is born and lives in Amsterdam. For the past 30 years she has been at the forefront of research and education in textiles and flexible design. Using contemporary materials and processes, such as neoprene rubber, foam polyamides, vacuum moulding and lamination, Blaisse creates non-woven forms for the body that are poetic and deceptively simple. Her interests lie in the intersections between art and fashion, incorporating video, performance and photography. She explores sculptural performance with the body as a critical element for the animation of material form.
mariablaisse@xs4all.nl

christoph de boeck alias Audiostore creates sound and music for contemporary dance, performance and theatre productions. With Heine R. Avdal and Yukiko Shinozaki he is a founding member of Deep Blue, a collective producing dance/performances in which audio and video technology maintain a tense relationship with movement. In 2003 Audiostore released a track on the Belgian electronica compilation of Glamor is Undead (Knobsounds label, Brussels). That same year de Boeck won first prize in the Bruges (B) Concertgebouw contest Liesbeth Concours with a laptop interpretation of Rachmaninov's Third Piano Concerto.
xoph@audiostore.org
http://www.audiostore.org

alkan chipperfield is a PhD student in Cultural Anthropology at the University of Adelaide, South Australia. He has been engaged in anthropologically-based fieldwork with FoAM, researching mixed reality, public event and transformation.
alkan@fo.am

carole collet (MA) is Course Director, MA Textile Futures at Central Saint Martins College. She is a textile designer and consultant in the area of textile print, R&D, trend forecasting, sustainable design, and intelligent textiles. Her consultancy work has included clients such as DMC, Boussac, Koji Tatsuno, Hoechst, Global consultants, Ian Ritchie architects. Carole's current academic research 'Poetic Textiles For Smart Homes' is a design quest which aims at developing innovative textiles for the domestic market. Sustainable values underpin both the design process and the design outcomes.
c.collet@csm.arts.ac.uk
http://www.textilefutures.co.uk/

nicolas collins is a composer, performer, and installation artist. He studied composition with Alvin Lucier at Wesleyan University, worked for many years with David Tudor, and has collaborated with numerous soloists and ensembles around the world. As a composer he has helped pioneer the use of quirky hybrids of high and low technology in live performance. His work transforms small amounts of found sounds, texts and technologies, suspending and varying fleeting sonic events. Collins' installations and performances have been presented at venues around the world, including The Whitney Museum of American Art, Berlin Biennale, ZKM and Ars Electronica. He is editor-in-chief of Leonardo Music Journal.
http://www.nicolascollins.com

dieter van dam studied audiovisual arts, specialization radio and is currently finalizing an MA in philosophy. To keep balance between his thinking and his doing, he presents radio shows and experiments with different media as soundscapes and radioplays. Together with Els Viaene, he created a non-linear story in sound, out of the basic material of the .x-medk. workshops. Guided by the sounds of the presented artworks, they mixed the most illuminating visions of the organizers and tutors into a site-specific aural landscape that was broadcasted and streamed during the .x-medk. public days.

pablo diartínez graduated in Fine Arts (Seville University)/Graphic Design (Granada Un.), Film and Transmedia Art (Sint-Lukas Hogeschool Brussels). He also followed music studies and many other workshops and courses on different disciplines. In addition to his painting work, he has published and exhibited illustration and comics works and directed magazines and workshops. In the film field, he has directed documentaries as well as animations, video installations, video-art/experimental works and video walls for the theatrical scene and collaborated as an animator, special effects expert, editor or cameraman for the work of others.

jelle dierickx is currently working as a musicologist at IPEM-Ghent University. His musico-literary research focuses on the various forms in which a fusion between poetry and music has been attempted in the recent history of sound. He is also the artistic leader of five International Krikri Festivals on Polypoetry (Gent, Belgium) and of several other concerts and performances.
http://www.krikri.be/main.php?lang=en
http://www.ipem.ugent.be/staff/jelle.html

alejandro duque (medellin-saas fee). Take the "politics of friendship" as a rough guideline to the mindset behind smuggling goods and ideas - aka filesharing. Since year 2004 Alejo is a Ph.D candidate at EGS (www.egs.edu). His free/libre time is spent striving to interface place, location and trajectory across all networks in a south to east axis and using his body as a test ground. In S.O.U.P (http://soup.znerol.ch) a "real-time" mapping endeavour, Alejo and his collaborators map the territories using audiovisual representations.
alejo@altred.net
http:// co.lab.cohete.net

elpueblodechina aka **alejandra perez nuñez** is a media designer and a performer working with open source tools, circuit bending and essay writing. She collaborates with different groups like **okno** (brussels), V2_organisation (Rotterdam), euromovements (Barcelona) and universite tangente (Paris). She develops a practice related to appropriation, civil society, women and self mediation through electronic media.
alejandra@v2.nl
http://www.elpueblodechina.org

matthew fuller is currently Reader in Media Design at the Piet Zwart Institute, Willem de Kooning Academy, Rotterdam. He is author of a number of books including, 'Behind the Blip, essays on the culture of software' (Autonomedia, 2003), 'Media Ecologies, materialist energies in art and technoculture' (MIT Press, 2005), and the forthcoming pamphlet 'Softness, interrogability, general intellect, art methodologies in software' (Digital Research Unit, Huddersfield, 2006).
http://www.pzwart.wdka.hro.nl/

nik gaffney is a founding member of FoAM, where he operates as a tangental generalist, designer, programmer and sous-chef. He prefers breadth-first-searches and bottom-up-design; randomness as a strategy, and depth where required; dynamic to static; Lisp to C; realtime rather than recorded; and complexity over the complicated. He is also part of 'farmersmanual', a pan-european, net-based, multisensory disturbance conglomerate. {buzzing, clicking, destructuring and ecstactic flickering}. Partially Luminous.
nik@fo.am
http://fo.am/, http://rorschach.test.at/

HC gilje constructs real time environments using video, audio and space, as installation, set design and performance, as well as working with space within the frame of single-channel video. Gilje has focused on alternative channels for presenting his work throughout the world; in music, theatre, contemporary art and cinema venues, festivals and through several international dvd releases. He is a member of the video-impro trio 242.pilots (image award at Transmediale03, Berlin), and is also the visual motor of kreutzerkompani.
http://www.nervousvision.com

dave griffiths started writing software art in ZX BASIC on a Sinclair Spectrum. He now writes free software audio and graphics applications, and performs improvised music and animation by live coding. Dave has appeared at various events using/writing his own software, including Barcelona's Sonar festival, the Linux Audio Conference in Karlsruhe, and at the READ_ME Software Art Festival/Dorkbot City Camp in Arhus, Denmark.
dave@pawfal.org
http://www.pawfal.org/dave

franziska hübler studied Fine Art at the Hochschule für Bildende Kunste in Hamburg. In 2001, after several years of working as a designer and technologist on computer-related projects, Franziska studied at the Interaction Design Institute in Ivrea, Italy, where her research focused on moving away from the desktop and towards physical computing. Franziska has since founded her own design practice, Truth Dare Double Dare in Hamburg, and continues to work on wearable and physical computing. She is a Förder Professor at the Hamburg University of Applied Arts.
franziska@truthdaredoubledare.com
http://www.truthdaredoubledare.com/

isjtar commonly known as **Junior** and a few other names is a composer of electronic music and a new media artist. After several years investigating electronic music in a more traditional way, he is now focusing on generative forms and installations. Due to some persistent echos of his past, he keeps a strong link with China. He is temporarily relocating to Beijing, leaving his beloved Brussels for a few projects in the People's Republic.
He is a core member of sensoor and occasionally works with **okno**/code31/mxHz.
http://www.ruccas.org/index.php?Isjtar

margot jacobs is an interaction design researcher exploring the playful, emotional and appropriate incorporation of technology in everyday life, developing innovative design methods and experimental prototypes for social interventions in public space. Her work at the Interactive Institute's RE:FORM studio focuses on energy awareness, open and sustainable systems, wearables and textiles, public technology platforms, and community expression. Her previous experience includes a year as research fellow at the Interaction Design Institute Ivrea, Italy. Margot also holds a BA in Industrial Design from the Georgia Institute of Technology and a master's degree from the Interactive Telecommunications Program in New York.
margot.jacobs@tii.se
http://www.kuriosa.org/

akihiro kubota describes himself as an algorithmic improviser/digital materialist. He is professor at the Tama Art University, Tokyo, Japan and a pioneer in software art, audio-visual installations and internet performances. For several years he has been developing collaborative artworks in networked setups. In his work he's researching the limits of technological art, starting from a conceptual and abstract background.
With Guy Van Belle/xgz he started the 'Society of Algoritm', working on netbased music performances.
http://homepage2.nifty.com/~bota/
http://societyofalgorithm.org

lina kusaite completed a European Master of Arts in Fashion and Textile Design in the Netherlands and France. Her graduation collection was nominated for the 'Prince Bernard Prize' in the Netherlands, and was awarded as the best conceptual fashion collection in Vilnius/Lithuania. Lina joined FoAM as experimental textile designer in 2001. Within FoAM she focuses on designing and realizing interactive environments, researching the field of smart textiles, as well as working as an illustrator. Aside being a core member of FoAM, Lina is a concept artist for several games developed by Tale of Tales (Auriea Harvey and Michaël Samyn).
lina@fo.am
http://fo.am/, http://cocooncharacters.com

maja kuzmanovic is a generalist interested in inciting small miracles in everyday life. She received her BA in Design Forecasting (HKU) and MA in Interactive Multimedia (University of Portsmouth). Throughout the 1990s she collaborated with scientific institutes, as well as roamed the field as an independent artist-researcher. She worked in MR, VR and online, infusing digital technologies with physical movement, narrative alchemy and audiovisual poetry. For her works, Maja was elected one of the Top 100 Young Innovators by MIT 's Technology Review in 1999. She founded FoAM in 2000 and has since functioned as FoAM's PI, eco+media artist and head chef. Her leadership skills have been recognised by the World Economic Forum, awarding Maja with the title 'Young Global Leader' in 2006.
maja@fo.am
http://fo.am

annemie_maes/okno/so-on holds a masters degree in fine arts and cultural studies. She is founder of ‹so-on› [former LookingGlass], a group of artists and curators working with image, sound and technology. In their art projects they research the transversal field of installations, performances and audio-visual compositions. Their focus is to identify innovation and change while developing artistic projects, and focus on new aesthetical presentation techniques. They work closely together with multiple collectives in Belgium and abroad. As co-founder of **okno** [together with Guy Van Belle and Gert Aertsen], Annemie Maes is strongly involved in the artistic production and presentation of **okno**, and is responsible for **okno**'s day-to-day management.
soon@so-on.be
http://so-on.be , http://**okno**.be

julian oliver is a New Zealand-born free-software developer, educator, composer and media-theorist. He has presented papers and artworks at many international electronic-art events and conferences. Under the moniker 'delire' he has performed his game-based music software at venues throughout North America, the EU, Japan and the South Pacific. Julian has given numerous workshops and master classes in game-design, artistic game-development, virtual architecture, interface design, augmented reality and open source development practices worldwide. In 1998 he established the artistic game-development collective, Select Parks.
julian@selectparks.net
http://www.selectparks.net

eleonora oreggia was born in Milan. After classical studies she moved to Bologna, where she participated in the mutoid tekno movement and the early italian pirate television network. She graduated with honour in Semiotics of Animation at University of Bologna. Since September 2003 she lives in Amsterdam. A special connection to the Netherlands Media Art Institute, Montevideo Time Based Art, where, after an internship in 2003, she often works on projects in the field of research and preservation of video-art. Current collaborations include ASCII, ETC, Streamtime. She is now developing different performances and installations using 'pure data', an open-source graphical programming environment.
eleonora@dyne.org
https://zolder.scii.nl/~xname/

erik parys graduated in Film in the Sint-Lukas Hogeschool Brussels, where he still lives, and works on different film projects and follows continued Music studies. He has directed award-winning documentaries, and screened his work in festivals such as Viewpoint (Gent) and art centers as the M.A.P. and Beurschouwburg (Brussels). His current projects include fiction (Framed by Time), video art and music. He's also involved on many other film projects as editor and cameraman.

casey reas is an artist and educator exploring abstract kinetic systems through diverse media, focusing on generating systems that produce behavior and exploring issues of control and communication between people and machines. Reas has exhibited and lectured in Europe, Asia, and the United States and his work has recently been shown widely. In 2001, Reas was a founding professor at the Interaction Design Institute Ivrea. In 2003 he became an Assistant Professor in the Design | Media Arts department at UCLA. Reas received his MS degree from MIT where he was a member of John Maeda's Aesthetics and Computation Group (1999-2001). With Ben Fry, he is currently developing Processing, a programming language and environment built for the electronic arts community. Processing was awarded the Net Vision Golden Nica at Ars Electronica 2005.
http://www.reas.com
http://www.processing.org

rgb~toysband was created in October 2004 during a collective dinner with all participants of the hardware-hacking workshop given by Nicolas Collins and initiated by .x-med-k. Someone stupid said "And what if we started a little band playing our rearranged cheap Hongkong made plastic toys?". Hidden visual and digital artist Crap[eye], alias R, answered "Okay". Very visual artist, drummer and communication specialist Bartaku, alias B, said "I'm in". And film-slave, vidiot and down-to-earth Theoumek said "Let's do it". Nobody else seemed interested and since then they've been gathering on a very irregular basis to get high on toysnoise.

david rokeby is a sound and video installation artist creating interactive installations since 1982. David uses technology to reflect on human issues and interactivity in order to explore intuitive, bodily, spatial and intimate relationships between the computer and the human being - also against the general notion of what computers are good for. His work has been performed / exhibited in shows across Canada, the United States, Europe and Asia. Recent Awards include the first BAFTA award for Interactive Art in 2000, a 2002 Governor General's award in Visual and Media Arts and the Prix Ars Electronica Golden Nica for Interactive Art 2002.
http://homepage.mac.com/davidrokeby/

jan schacher aka **Jasch** is an active musician in the fields of electronic and improvized music, performance, jazz and contemporary music. He explores the symbiotic relationships between sound and image in a live, improvisational context for stage and in installations. Jasch performed and exhibited throughout Europe, the United States, and Canada. He released many CDs on various labels.
http://www.jasch.ch

sabine seymour concentrates on the next generation wearables. She introduced the course 'Fashionable Technology' at Parsons School of Design and is also an Adjunct Faculty at University of Art and Industrial Design in Linz, Austria. She co-curated the Wearable Experience section at ISEA2004 and has recently published the book Intelligent Wearables. Moondial is the commercial entity that resulted from her research and concept works, based in Vienna with an outlet in NYC. Sabine received a MPS in Interactive Telecommunications from NYU and a Joint-Master's degree from the University of Economics (Vienna) and Columbia's MBA program.
sabine@moondial.com
http://www.moondial.com

jenny tillotson is an artist and designer who designs clothing with computerised scent-output systems for health and wellbeing. Jenny received her BA in Fashion Communication from Central Saint Martins and a PhD from the Royal College of Art. She is a Research Fellow at Central Saint Martins, Associate of the British Society of Perfumers and Fellow of the Institute of Nanotechnology. Prior to her academic work she was a stylist.
jenny@tillotson.com
http://www.tillotson.com

angelo vermeulen is a visual artist working with photography, video, new media and installations. Originally trained as a biologist (PhD in 1998, University of Leuven, Belgium), he also followed photography training at the Art Academy of Leuven. After having worked with Nick Waplington in London for a year, he took up post-graduate studies at the Higher Institute of Fine Arts (HISK) in Antwerp from 2001-2003. In 2003 he was nominated for the East-Flanders Provincial Prize for Visual Art. He is preparing his first book on the relation between art, technology and spirituality in partnership with art philosopher Antoon Van den Braembussche.
focusfree@edpnet.be

els viaene the aural landscape has always been her favorite habitat. She's exploring it through field recordings of all kinds in the most different places. The rich textures and rhythms of 'existing' sounds are the musical scores for her pieces. In installations she recreates new rooms into an existing one by accentuating or making disappear the physical boundaries. Streaming radio makes this concept even more complete. The art and beauty of radio is all about telling stories in sound.

yon visell is an artist, engineer and physicist studying the dynamics of human movement in the context of lifelike, interactive systems. He is pursuing his Ph.D in Engineering in the Center for Intelligent Machines and the Center for Interdisciplinary Research in Music, Media, and Technology at McGill University. He previously studied the physics and geometry of elementary interactions including superstrings at The University of Texas at Austin, and his subsequent background includes interactive systems design and award-winning music software development at Ableton in Berlin. He has undertaken interactive systems design research at his own organization, Zero-Th Association (HR), and with FoAM (BE).
yon@proptronix.com
http://www.cim.mcgill.ca/~yon/,
http://www.zero-th.org/

rachel wingfield set up the company Loop.pH with artist Mathias Gmachl to create and develop new and reactive surfaces and structures, and has worked on architectural and fashion commissions for product development. She is currently a Research Fellow at Central Saint Martins School of Fashion and Textiles, where she is researching the role interior textiles and surfaces play in energy efficiency by mimicking the active and self-sufficient characteristics found in the world of plants. Rachel is a senior lecturer at London's Camberwell College of Arts for the new BA course, 3D Design: Materials and Critical Practice. Her work aims to capture the dynamic, rich display of botanical life in textiles with a continuing theme of growth and biomimicry.
rachel@loop.ph
http://loop.ph/

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http://xmeda.be
mailto:info@xmeda.be

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