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THE OPEN FUTURE
Free culture

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OPEN WORLD - FREE CULTURE

In a recent TED talk (June 2012), Don Tapscott* explained the "four principles for the open world": collaboration, transparency, sharing and empowerment. He showed us how this open world can be a much better place.

Open and free are the two keywords of the digital revolution, which has led to the emergence of "free culture", to reprise the title of Lawrence Lessig's book**. It all started with Richard Stallman's open software movement. The same principles of open licensing were applied to the arts, sciences, education, etc. Today, entire communities share these values of free art, open science, open source architecture, collaborative design, open and free Internet.

In order to analyze these cultural and social trends, we invited the critic, researcher and curator Marco Mancuso, along with his Digicult team in Italy, to produce this "Open Future" issue. Open data, DIY science, buildings constructed under a Creative Commons license, free music, biohacking, open innovation... This panorama of views opens up possibilities well beyond the controversies surrounding copyright and intellectual property. With a digitally open world comes shared knowledge and collective consciousness.

We would particularly like to thank Jean-Christophe Théobalt for the French Ministry of Culture and Communication's support for this publication, as well as all the sponsors and partners of Musiques & Cultures Digitales.

Open and share this special issue...

Anne-Cécile Worms

* Don Tapscott, www.ted.com/speakers/don_tapscott.html

** Lawrence Lessig, "Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity", Penguin USA, 2004.

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INTRODUCTION

■ The time we are living is the stage for continuous transformations in the ways we think about art, science, design and culture. It's a time of collaboration and sharing. The progressive de-institutionalization of the forms of production, management and consumption of material and immaterial goods brought by new technologies is reshaping the way we conceive culture, giving more importance to bottom-up taxonomies of reality and questioning traditional powers, thanks to unforeseen paths of change.

Some of the keywords that are going to be crucial in mass developments during the next years are already known, because they are the ones that have shaped, addressed and influenced cutting-edge practices and communities in the last decade.

Computational design is becoming a disruptive approach to define a methodological, conceptual, and technical set of instruments to re-materialize complexity in the physical world. Digital manufacturing - the practice to directly produce customized material goods and architectural elements - is going to reshape the buildings and cities in which we live.

The rise of open collaboration in science will blur the boundaries between scientific experts and lay citizens: a problem of power and a transformation of science expert epistemology. The walls of science's ivory towers are not firm anymore, and citizens are more and more commenting, discussing, deliberating and producing scientific knowledge. Do-It-

Yourself science is going to revolutionise the relationships between nature and culture as we know them.

The multiplicity of information ecologies (and the consequent fragmentation of values and symbolic systems) suggests that we are entering a phase that calls for the ability of letting meanings and practices emerge from complexity itself, questioning the ideology of individual creativity and evaluating in a new way the social innovation nurtured by peer-to-peer networks. New communities will arise, the existent ones will be strengthened and they will search for new forms of organization and communication.

Traditional knowledge hierarchies will increasingly shift toward folksonomies: user-driven ways to connect elements of reality. Digital commons - free and open source kinds of production and distribution phenomena - will expand their influence on the cultural and artistic practices in a broad sense.

Digital technologies, free software and open platforms will standardize and extend the processes of sound experimentation established in the second half of the 20th century, setting the stage for broader and collective sharing and collaboration that redefine the ways as well as the formal and institutional frames for music and sound production, distribution and reception.

It's clear that such phenomena are already acting, both horizontally and vertically. Horizontally, they are blurring the boundaries between

different fields and disciplines, merging methodologies, languages, tacit and explicit know-hows. Vertically, they are affecting the distinction between "high", academic approaches and "low", ingenu ones. This cross-pollination creates enthusiasms and skepticisms at the same time. On the one hand it's perceived as an unforeseen expansion that will led to continuous innovation. On the other hand it's seen as a menace for stability, quality and fairness.

This monographic issue will explore this panorama according to six curators specialized in five different fields. Firstly, Bertram Niessen will investigate the social ambiguity of digital creativity, the chances given by bottom-up co-production and the challenges offered by web-based practices of creative sharing. Secondly, Claudia D'Alonzo and Marco Mancuso will focus on the changes taking place in relation to creation practice, dissemination and fruition of audio-visual artistic contents. Thirdly, Elena Biserna will provide an overview on musical artistic practices and, at the same time, show the significance of this scenario in the sphere of cultural and everyday practices. Fourth, Sabina Barucci will investigate reasons, state of the art and developments of the relationships between design, education and complexity, looking at new cognitive forms as the output of such phenomenon. Finally, Alessandro Delfanti will examine the problem of the transformation of science expert epistemology, focusing on the political, artistic and cultural dimensions of biohacking and DIYbio. ■

Bertram Niessen

INFORMATION / DIGICULT

■ SECTION EDITORS

Sabina Baruccci is an architect, designer and researcher. She focuses on several design fields with a specific interest in advanced forms of networking within design strategy and computational design. Since her studies in Genoa and Grenoble to the professional activity in Berlin and Milan, she explored design systemic approaches in several fields of application such as landscape urbanism, urban mobility planning and complex buildings developments.

Elena Biserna studied Humanities and History of Contemporary Arts at the University of Bologna and completed a Ph.D. in Audiovisual Studies at the University of Udine. Her interests deal primarily with interdisciplinary areas of esthetic research focusing, in particular, on expanded sound and on contextual, performative, and ephemeral arts. She is a contributor to *Digimag* and *Cinergie* and collaborated with several organizations for the development of cultural, curatorial and editorial projects.

Claudia D'Alonzo. Graduated in Contemporary Art History, she attends the International Ph.D in Audiovisual Studies at the University of Udine. She has been interested for several years in audiovisual experimental practices. She belongs to the management committee of Digicult, with which she collaborates also as writer in the audiovisual section and curator. She has published catalogues and articles for magazines and journals. She has been curator for national and international presentations, screenings and exhibitions.

Alessandro Delfanti is a researcher working on the evolution of open access and open source in the biomedical sciences. He is an editor of the open access *Journal of Science Communication* and teaches Sociology of New

Media at the University of Milan. As a journalist he writes about science, culture and politics on several Italian newspapers and magazines. His first book, *Biohackers*, will be published in 2013 by Pluto Press.

Marco Mancuso is a critic, researcher and curator in the field of digital technologies applied on art, design and culture. Founder and director at Digicult and Digimag Journal, he teaches Multimedia Art Languages at NABA in Milan. Visiting professor at Transmedia in Brussels, he works with Digicult Agency as consultant, curator and promoter while skilled on open communication, social networking and digital publishing. He was included in the publication *Cultural Blogging in Europe* by LabForCulture.org.

Bertram Niessen is a researcher, teacher, activist and consultant in the fields of electronic art, digital cultures, and urban environments. In 2001 he co-founded the Italian electronic art collective otolab, with whom he teaches Audiovisual Performance at NABA in Milan. He teaches at the Milano-Bicocca Social Sciences Phd program (where he hold a PhD in Urban Studies) and collaborates with the University of Milan on social innovation, open source modes of production, and digital research methods.

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Luciano Palumbo is MA graduated in Film And Audiovisual Studies at Università di Udine and Université Sorbonne Nouvelle. He's interested in documentaries, labours and industrial films, home movies and film technology.

Sara Tocchetti was trained as a biologist and then moved on to the social studies of science at the London School of Economics. She investigates the cultural significance of a network called DIYbio.

DIGICULT

Since 2005, Digicult has been a cultural platform that examines the impact of digital technologies on art, design, culture and contemporary society. Based on a Network of critics, curators and professionals, Digicult is a web portal and the publisher of the Digimag Journal, providing online tools and web 2.0 strategies to facilitate media communication activities. The Digicult Agency promotes the work of selected media artists, developing also exhibitions and cultural/artistic events. Digicult is currently active in the publication of critical and theoretical essays with its brand new service Digicult Publishing. ■

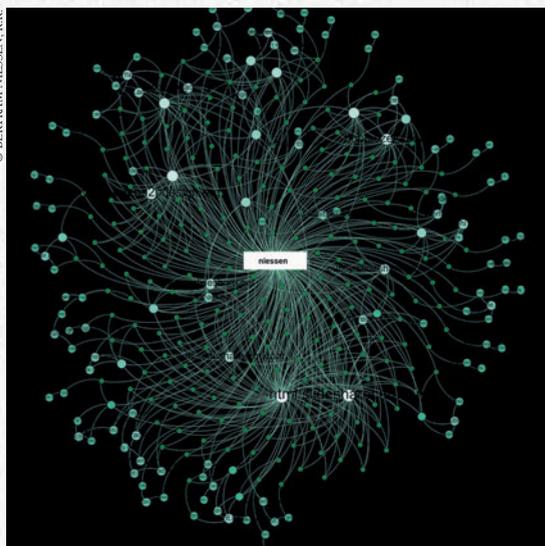
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FROM INDIVIDUAL CREATIVITY TO COLLECTIVE INNOVATION

To say that Web 2.0 changed the way we think and practice creativity is a commonplace. Nevertheless, if on one hand concepts like “digital creativity” are daily spread by mass media, on the other hand there is still a gap between the critical thought developed by researchers, artists and activists, and the common sense. The goal of this section is to collect some of the most urgent questions about the relationship between social processes, creativity, innovation and the Web, and to try to answer them together with four of the most cutting edge thinkers of the last years.

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Bertram Niessen, network portrait n°1, 2012.
Bertram Niessen / realised with Gephi. <http://gephi.org>

■ First of all, I asked Adam Arvidsson to write a critical contribution to help us build new tools to overtake the “creative class paradigm” - a conception indicating the relationship between creativity and innovation that affected deeply the media discourse of the last decade. In a period of change marked by the consolidation of post-fordist economy and by the subsequent proliferation of new education fields, new professions, and new software and strategies to manage immaterial production, the idea of the creative class was often adopted in a superficial and uncritical way. Individual creativity became the main engine of the world around us and “be creative” came to be an imperative that no one could avoid. At the same time, the rise of collective intelligence in social networks and the uncountable artistic, political and social bottom-up experimentations fostered by new technologies started to challenge the romantic myth of individual creativity. Now it is time to pose new questions. What forms of creativity are we really talking about? What is the rela-

tionship between individual creativity and collective innovation? Does it make sense to import the creative class model into contexts radically different from the Western ones? Arvidsson tried to answer with a text that analyzes the ecology of innovation in Bangkok.

The second text is a cross-interview that investigates the issues of social networks and creativity from a peer-to-peer and bottom-up point of view. The growing multiplicity of information ecologies - and the consequent fragmentation of values and symbolic systems - suggest that we are entering a phase that calls for the ability to let emerge meanings and practices from complexity itself, by questioning the ideology of individual creativity and by evaluating in a new way the social innovation nurtured by peer-to-peer networks. Our worldview has never been so easy to communicate; it has never been so easy to get in contact with individuals and groups that agree with it. Distributed collaboration

TOWARDS CREATIVE MASS?

Let us start in a different place: Bangkok, Thailand. With its sharp contrast between refined beauty and abhorrent filth; international style shopping centers and stinking gutters, all vertically stratified from the level of rats and cockroaches up to 50th floor cocktail bars, this city illustrated the epitome of a post-modern urbanism to come, as Jean Baudrillard observed already in the 1980s.



PHOTO © BERTRAM NIELSEN, P.R.

Bangkok

■ But the "Bangkok-condition" is prophetic also in a more concrete socio-economic sense. The financial apocalypse that now rages in Europe and the US hit Thailand in 1997 as the baht devalued by 20 per cent and foreign capital fled the city's overheated real estate market, leaving a forest of half built skyscrapers that still decay in the tropical mold: you can see the cracks in the cement from the sky-bars above! The 1997

crisis also created mass unemployment among the seed of a Thai creative class: advertising, communication, PR, branding and media were all booming industries in the 1990s, now they folded, leaving hordes of well educated twenty-something on the street.

But the Thai creative class reorganized, and within a couple of years Bangkok was well on its way to becoming an Asian center for fashion, music and design, rivaling Seoul and Hong Kong. Much of this happened at the street level: in-between the crumbling skyscrapers spontaneous street markets emerged, where young designers were peddling their collections and hipsters selling antique 1970s paraphernalia; in and around the newly built Sky train stations, a new generation of street vendors with business degrees created small chains of branded and ostensibly cool coffee shops, lines of pens and stationary stores or ice cream parlors. Soon enough the city's huge markets were invaded by a new generation of creative vendors, and turned into nightlife hotspots as bars and clubs mushroomed in-between the vendor stalls. In the mid 2000s when this creative wave achieved a critical mass, the Thai government made some (largely symbolic) efforts to reign in and capitalize on it and, in the case of the fashion scene, to connect it more systematically to a declining Thai textile industry.

These efforts were framed in the then popular rhetoric of the Creative Class, imported from the UK and Australia where it stood at the height of its popularity. But Thai creativity moved, and still moves at a different level: it is more of a mass phenomenon, genuinely rooted in the street and the complexity of the chaotic urban framework that surrounds it, and its products are consumed by a popular market: lower middle class students and office girls for the original fashion innovations for sale in the night markets, and the poor of the Global South as those innovations trickle down to the wholesale textile markets where street vendors from India, Africa and the Middle East stock up on supplies.

The Bangkok model of creativity is exotic and different but it is also quite instructive as to what is currently going on in the West. Here too, although much more successfully so, the notion of 'creative class' achieved popularity as a way of regulating a booming mass creativity and connecting it, via policy decisions, to the financial expansion under way. Here too, the notion of creative class has lost its popularity as financial capital has dried up. Let us examine this process in more detail.

In the West (what was not yet known as) "creativity" began to become a way of life in the 1960s, as (mostly) middle class youth used the new powers of expression conferred on them by the combination of longer hours of leisure and a booming consumer society to voice their discontent with the rigors of industrial mass society. As the political edge faded away and social movements turned into subcultures, and as access to the technologies of cultural produc-

tion like music instruments and recording devices became cheaper, the 1970s saw a flourishing of music, fashion and art scenes all across Western capitals, along without the generalization of an artistic lifestyle as an established middle class ideal (spurring a gentrification of the abandoned industrial districts of New York and London, as "loft living" caught on among advertising executives).

In the 1980s cheaper computers and an emerging internet culture (or "cyberculture" as it was called at the time) added to the ease of cultural production, and by the end of that decade most larger cities in the West were endowed with an active underground, combining fashion, art, computers and alternative lifestyles around a now central electronic music scene, and building on the social movements of decade-old paths that had, by now lost their ideological direction and disintegrated into identity politics, for those still idealistic, and post-punk cynicism for the rest. When the dot.com boom hit in the mid 1990s this underground was perfectly positioned to be at the receiving end of a tidal wave of corporate cash as every bank, supermarket chain, government bureaucracy or evil multinational corporation needed its own website.

Over night, underground turned into dot.com and cities like London, New York, Copenhagen and Stockholm filled with silicon alleys, where post-punks with programming skills — fresh out of the occupied houses, were burning venture capital by the millions. The notion of "creative class" was born out of this — short but happy — marriage between financial capital and the urban underground that had built up during the preceding decades.

The creative industries developed as the intermediaries able to capitalize on the new need for brandable content on the part of large multinational corporations and the creative talent able to produce it. And for a short time they seemed to be the only non-FIRE (Finance, Insurance and Real Estate) sector of Western economies that was genuinely growing. Web design and "media content production" emerged as booming industries, able, in the eyes of usually short-sighted policy makers, to redeem the ever threatening demons of post-industrial mass unemployment. And consequently "creativity" became a new ethos to be inculcated into schoolchildren, the unemployed and the marginalized. A number of pundits like Richard Florida and Charles Landry made their fortune on these hopes-peddling snake oil social theory that suggested that if you only made the city attractive to the creative class (late open bars and lots of ethnic restaurants) magical economic development would follow. And it did, but not in the way Florida had imagined. Urban regeneration policies based on the notion of creative class and creative cities were immensely successful in gentrifying decaying inner city neighborhood, quadrupling their real estate values (think Hoxton, London or Vesterbro, Copenhagen).

This created a real estate driven economic boom as, first, rising real estate prices attracted the wealthy middle class back into the city center, thus increasing the tax base and second, people recapitalized their mortgages and used the difference to buy BMW X3s and the newest Nokia phones. And it lasted as long as credit was cheap and flowed easily into the system via the banks.

So, with the exception of the first websites that emerged in the mid 1990s, the creative class never really created anything? A bit harsh perhaps, but it seems clear that the main function of the creative class, at least in Florida's description as bunch of 'exceptionally talented individuals' – advertising executives, media company people, branding consultants, and so on—was primarily that of building on a diffuse mass creativity that unfolded around them in the city – in this sense Florida was right in pointing at the city as a source of 'creativity' - and then packaging and selling it on to multinational corporations (the 'business anthropology', or 'event marketing' companies that boomed in the 2000s did precisely this), or alternatively, living and embodying a creative lifestyle that could justify real estate valuations. Now the creative class is gone (or on its way out as advertising, media and web design companies are folding), but the creative mass on which they have thrived remains, or even expands as, just like in Bangkok in the late 1990s, more and more MBA's go on the dole.

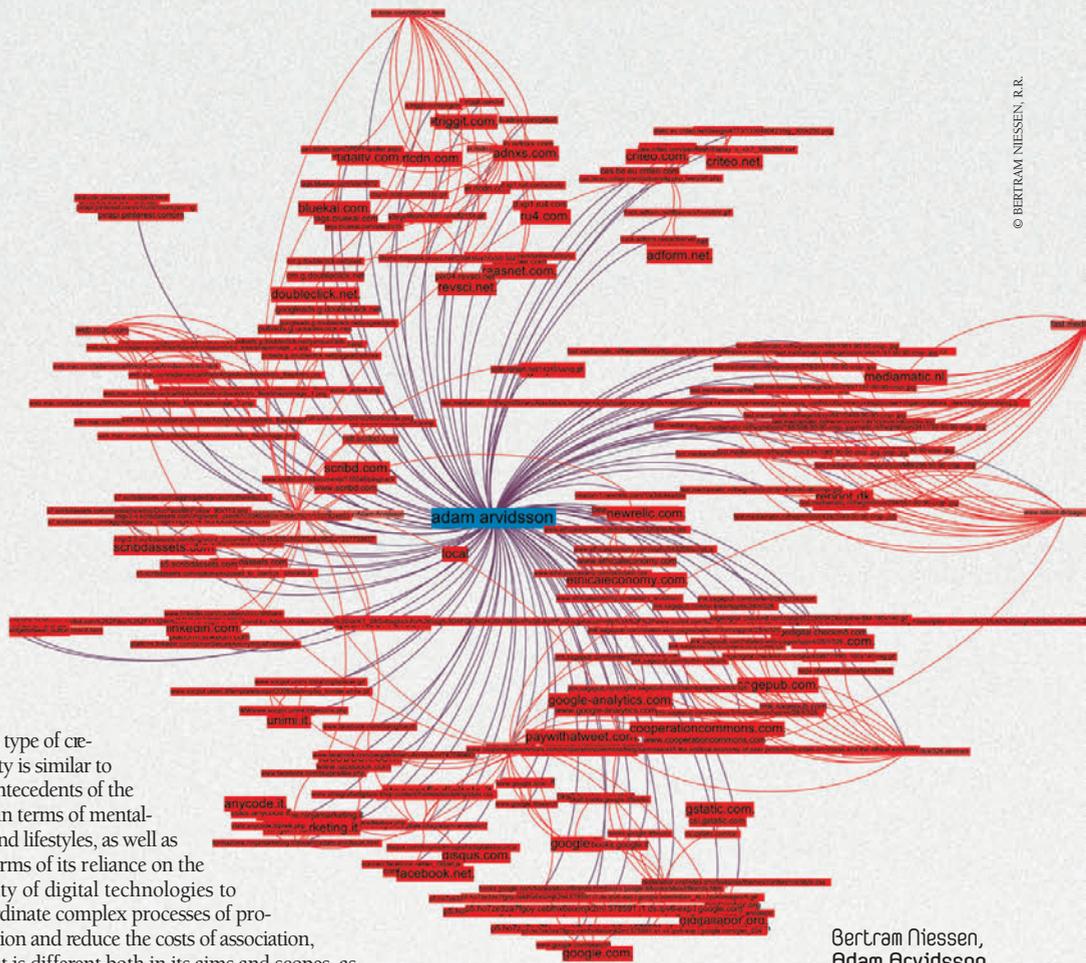
We can see two distinct developments in this creative mass. First, creativity is becoming more material and political, it is becoming more than just cultural creativity. New and cheaper technologies for material production; the diffusion of a recycling mentality and a general sense of readiness for a future of resource scarcity has driven the emergence of Open Design and Open Hardware networks; of 'makers' that bring industrial production back into the back yard with cheap 3D printers and laser cutters, sometimes, as in the case of bicycles and automobiles, combining the 'making' of new parts with the recycling of old ones; an Urban Agriculture movement of local food networks that either grow urban gardens or organize access to locally grown foods, thus bypassing the power of supermarkets and other large intermediaries.

Second, the social enterprise, "Impact Business" of "Changemaking" scenes are booming, attracting a new generation of young, mostly university graduates, who use the combination of an ethos of individual self-realization (or "impact") and business skills to address the issues that until recently were the preserve of social movements, welfare states and NGOs. At present the Changemaking sector is booming, attracting young graduate along with a steady movement of experienced professionalism as corporate lay offs or voluntary managerial flight hits in mid-career. Here creativity is executed as a concrete and pragmatic engagement with real issues and directed towards ethics of suitability and survival.

This type of creativity is similar to its antecedents of the 00s in terms of mentality and lifestyles, as well as in terms of its reliance on the ability of digital technologies to coordinate complex processes of production and reduce the costs of association, but it is different both in its aims and scopes, as well as in its lack of connection to the (dying) corporate/financial money circuit. (This is particularly true for the Changemaking sector that appears to be poorly connected to the huge investments in corporate social responsibility that multinationals now undertake).

And this new mass creativity points towards a coming of age of creativity, no longer just a matter of consumption art and lifestyles, nor of driving a largely symbolic financial economy, this kind of creative mass can become the genuine driver behind the transition to or sustainable economies at an urban level, catering, as it already does on cities like Detroit and San Francisco, and as Bangkok fashion designers already do (although in a less sustainable way), to a genuinely popular market for organic, suitable, recycled and zero impact consumer goods: a market that is growing as awareness of the impending catastrophe trickle down to the masses. And it is a true challenge for what remains of established political system and welfare state to understand how such a genuinely productive and useful mass creativity can be supported and enabled.

How better to connect it to financial capital, how to divert corporate spending on social responsibility into the kinds of pursuits that actually have an impact? And, importantly, how to define and measure impact in the first place? This concept is presently without any definition, and the absence of such a definition makes it impossible to evaluate the efforts of particular individuals or organizations against each other. Without such an objective system of evaluation, it will become impossible to remunerate creative individuals in any rational and legitimate way (who should get 1000 eur a month in minimal income, the people who drive an urban farm, or the rock band that, although it makes no mon-

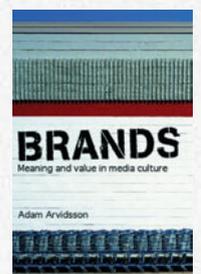


Bertram Niessen, Adam Arvidsson network portrait n°2, 2012. Bertram Niessen / realised with Gephi. <http://gephi.org>

ey for its music circulating in file sharing networks still attracts huge crowds to its concerts and has a zillion likes on Facebook?). To develop such a system of objective evaluation is particularly important as the labor markets and the Business to Business market for "creative content" — made up of television stations, advertising agencies and branding companies — are crumbling, and it becomes more difficult to survive on a creative lifestyle.

It is nice to think, as Yochai Benkler and a host of other enthusiasts do, that the new economy of social production is all about altruism and not about money. But until we find a way of actually remunerating people for what they do, only those privileged enough to not have to care about money will be able to engage in these pursuits. Without a notion of value that can organize a system of redistribution, participation in the new creative mass will remain a class phenomenon, limited to those who have trust fund. ■

Adam Arvidsson



TO READ:

Adam Arvidsson, Brands, meaning and value in media culture (London, Routledge, 2006)

Adam Arvidsson teaches sociology at the University of Milano, Italy. He is the author of *Brands, meaning and value in media culture* (London, Routledge, 2006), and has published several academic articles on social production, creative industries, and the political economy of cognitive capitalism. His forthcoming book with Columbia University Press is *The Ethical Economy*, co-authored with Nicolai Peitersen.

AN INTERVIEW WITH MICHEL BAUWENS AND GEERT LOVINK

DIGITAL MEDIA FOR NEW FORMS OF ACTIVISM AND COOPERATION

PHOTOS © RR

Michel Bauwens
& Geert Lovink.

■ You have a radically different approach towards social networks. On one hand, Michel enthusiastically embraces all conceivable social platforms, feeding its networks with an incredible amount of data; at the moment, Michel's Delicious account (mbauwens) lists nearly 64000 accurately tagged links. On the other, Geert is known for his hostility against commercial platforms, and in 2010 he abandoned Facebook with a public announcement on his blog. How do you define your tactical approach to social media? Do you think it is driving to a different conception and practice of digital activism?

Geert Lovink: In a book chapter that still has not been published, Sydney-based media theorist Chris Chesher asks a simple but brilliant question: how did the computer become social? I love that approach. Social media have a long history. We could say that computer networks have been social since day one in the 1970s. The possibilities are endless in terms of how people want to connect to each other—and the success of Twitter is a telling example. Our imagination at that level is not the problem.

The crisis we're facing is in the methods of appropriation, the parasitic behavior of companies such as Facebook and Google that can only imagine business models of cheating and spying behind the back of the user. The problem there is not the 'social' elements such as befriending but the overall absence of social media as public infrastructure, which genuinely belongs to everyone. We lack even the most basic elements of 'the commons', which in our digital context are usually only known as code and a handful of cultural artifacts. My approach towards 'social media' would be to define this collection of applications in the widest possible way. If something needs to be reinvented is the public, not the social.

For tactical media activists such long-term goals may not be their first concern but I am of a generation that really believed (and still

believes) that we have to incorporate in our resistance the work on alternatives. This cannot be postponed till after the revolution. In the heat of the fight no one cares. Tunisians cannot be blamed for using Facebook instead of Diaspora, back in early 2011, when proper alternatives weren't even available. That's pointless political correctness. Instead we should ask ourselves what we are going to do with the immense human interaction that can be mobilized—and channelled—and how we are going to design the 'techno-informal sphere' that is only growing and growing. Which protocols are used? And can they be changed?

Defend the freedom to communicate freely and protect yourself, if necessary. The main enemy is our own naïve passion to forget the politics of the tools that we fall in love with, time and again (Technikvergessenheit). For instance, in the past I was deeply into the promotion of Skype but now it is owned by Microsoft so how is that going to play out? One possible answer could be a 'social contract' between user and owner: I pay you for not analyzing me, to leave me alone and respect my online privacy. Stop with the free services as they will screw you in unknown ways, and let's build up public infrastructures for general internet usage (and here we should not just think of public access through wifi).

Michel Bauwens: I'm enthusiastically using platforms because it is an important way to reach people, and using politically correct alternative media reaches people that are already convinced. Not to be minimized, such platforms are often way more user-friendly and this is why there is such a massive adoption. We are not creating the world or the tools we live in, and have to make the best of them. In this, I feel our situation is not different than that of workers who were thrust in factories... they may not have liked them (and mostly didn't), but they needed to survive and they organized unions within factories, while other sectors created cooperatives.

I think that both approaches, resistance and creation are equally needed and not be in competition, but should be considered as part of an integrated and integrative strategy, each reinforcing the other. So for me the issue is, given the tools that we have at our disposal, how can we reach most people and, how can we organize ourselves as advocates of a new world? Please note that the P2P Foundation uses social media to spread the word about peer production, but does not rely on corporate social media for its own organization and communication.

Instead, with some exceptions, we use free software tools (open source blogging, FLOSS mailing lists, and others). And generally speaking, we are continuously peer-producing a knowledge commons, without any commercialization of our own media. We have volunteers specifically dedicated to promoting the use of free media in our internal communication. And in our phyle, i.e. our coop, we use exclusively such free media. On a deeper level, and despite the control of corporate platforms, I also deeply believe that social media are part of a great horizontalization of human relationships and enable/empower new social dynamics that can be used productively in many ways, witness being the key role of Facebook and Twitter in political mobilizations.

However, at the P2P Foundation we also strongly support the creation of autonomous media, and are monitoring their spread and use in a very active way. So, I would summarize, we tactically use media for communicating our visions, while we strategically build a commons structure for ourselves and support other commons-oriented infrastructures; and while we use social media, we are critical of them and spread critical views on their structural inequity and behaviors.

Creative industries were a key concept in Western countries throughout the '90s and '00s. They were glorified in books such as Richard Florida's "The Rise of the Creative

Class" and pushed by public administrations as a panacea for wealth and development. One of the consequences of this narrative was the boom of the myth of the individual creativity, reinforced by iconographic ICT "geniuses" such as Steve Jobs, Mark Zuckerberg and Larry Page.

Geert Lovink: Sure, but I have less of an issue with the use of computers and computer networks for individual use. To sign up for collectives and collective action is a voluntary act, something that I see as a very private, almost intimate matter. Working together is fun and works best in a very informal setting, when it really clicks between a couple of people that are passionate about what they want to achieve together. All the rest is boring work. The problem of the 'creative' discourse mentioned here is its old-fashioned ways to make money, firmly rooted into traditional intellectual property rights regimes that now work in most sectors.

Michel Bauwens: My problem with the creative class theory is that I think there is no such class. There are industry managers and shareholders, who of course could be smart, but their structural position is entirely different from mostly precarious and equally creative knowledge workers. In fact, I believe that one aspect of the value crisis is that it is precisely the explosion of creativity that has killed the 'market' for it, since market dynamics essentially work with scarcity. A creative and knowledge-based society needs to move beyond the market and beyond capitalism if it wants to fund creativity. The key issue is: since scarcity-based modes no longer work to fund creative pursuits, what abundance-economic models could replace them?

The emphasis on individual creativity often drives us to an underestimation of collective innovation. How do you interpret the tension between individual creativity and collective innovation? And what do you see as new alternative narratives that stress collaboration and cooperation?

Geert Lovink: Funnily enough there is already enough of an emphasis from the corporate community on collaboration and the social dimension. I don't see the tension, to be honest. What we could say, perhaps, is that the radical left often doesn't know how to deal with singular, sovereign individual talent. There is a (justified?) fear that the liberation of talent and creativity will lead to singular-monadic behavior: the artist as an impossible asshole.

The reality is very different. Artists can no longer survive unless they continuously work on their networks. They do not develop their ideas in isolation, nor do they realize their work entirely on their own. Collaboration is often part of the work, even if it is perceived as a single author work. Maybe you know that I prefer Christoph Spehr's concept of 'free cooperation' over the top-down definition of collaboration as

team work that is overseen by a boss. I love Spehr's emphasis on the negative in his definition that we only truly enjoy cooperation if we can freely leave it.

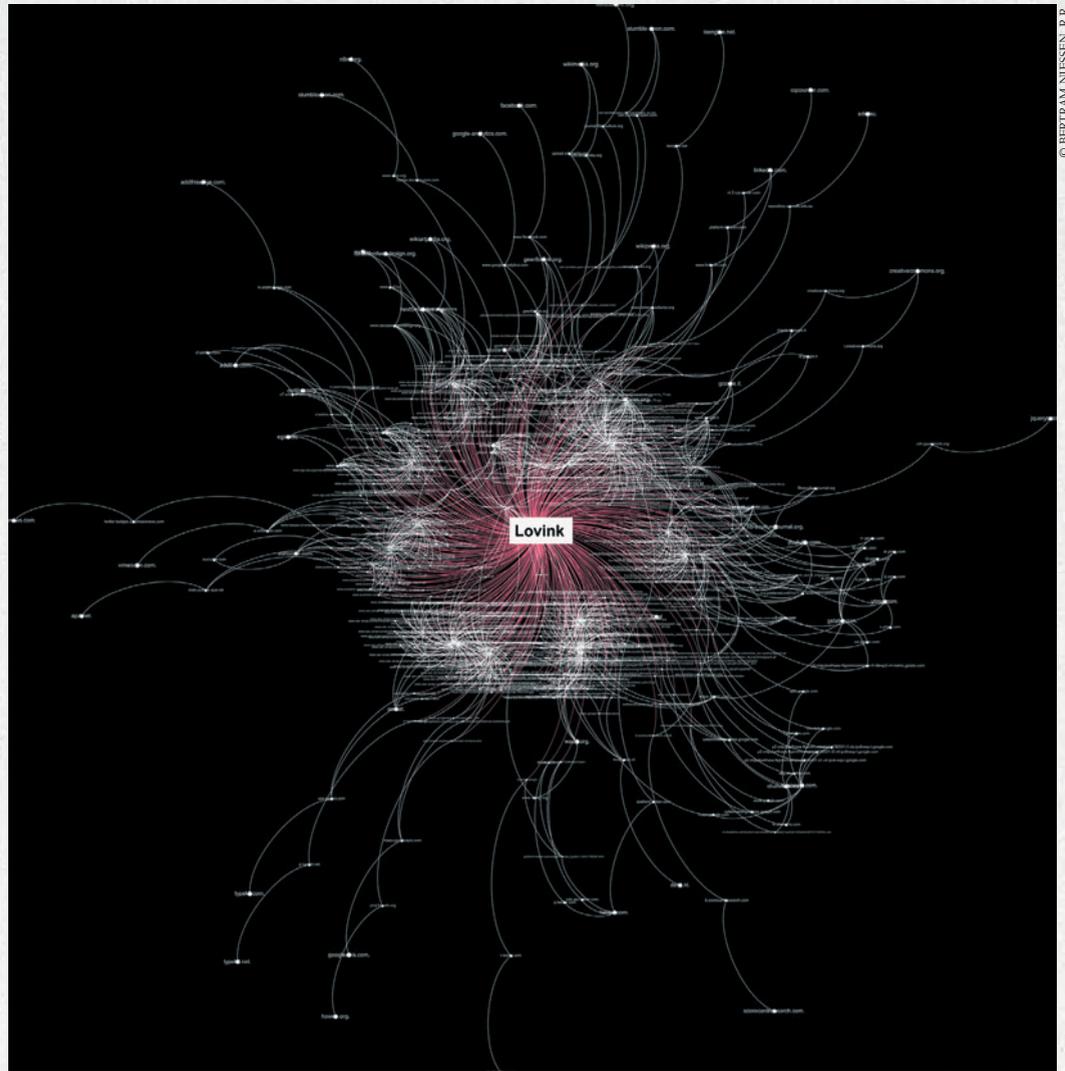
I often think that we should not teach our students to become socially aware artists. What they should learn is how to break through conventions and develop their own style. Good education is not raising armies of hardcore activists, willing to sacrifice for the Cause. My ideal student is someone who has learned to question (also the political agenda of his or her master). What counts is independent thinking and poetry. Social engagement as a politically correct gesture is something that I despise. In teresting activism happens like an accident. You stumble upon injustice—and act. It is much more interesting to see cultural and political themes indirectly popping up and taking over the meaning of a work. High aesthetics at its best is political by default, not because some slogans are written all over it.

Michel Bauwens: I think that by this time, at least on the web, the recognition of "me" creativity to "we" creativity has already happened, and is even creating its own reactionary counter-revolution, such as in the books of Jaron Lanier and the upcoming book by Andrew Keen. These authors seem to see the internet as a 'borg' that stifles individual idiosyncrasy. I do see dangers of certain methods of collective filtering, which can be main-

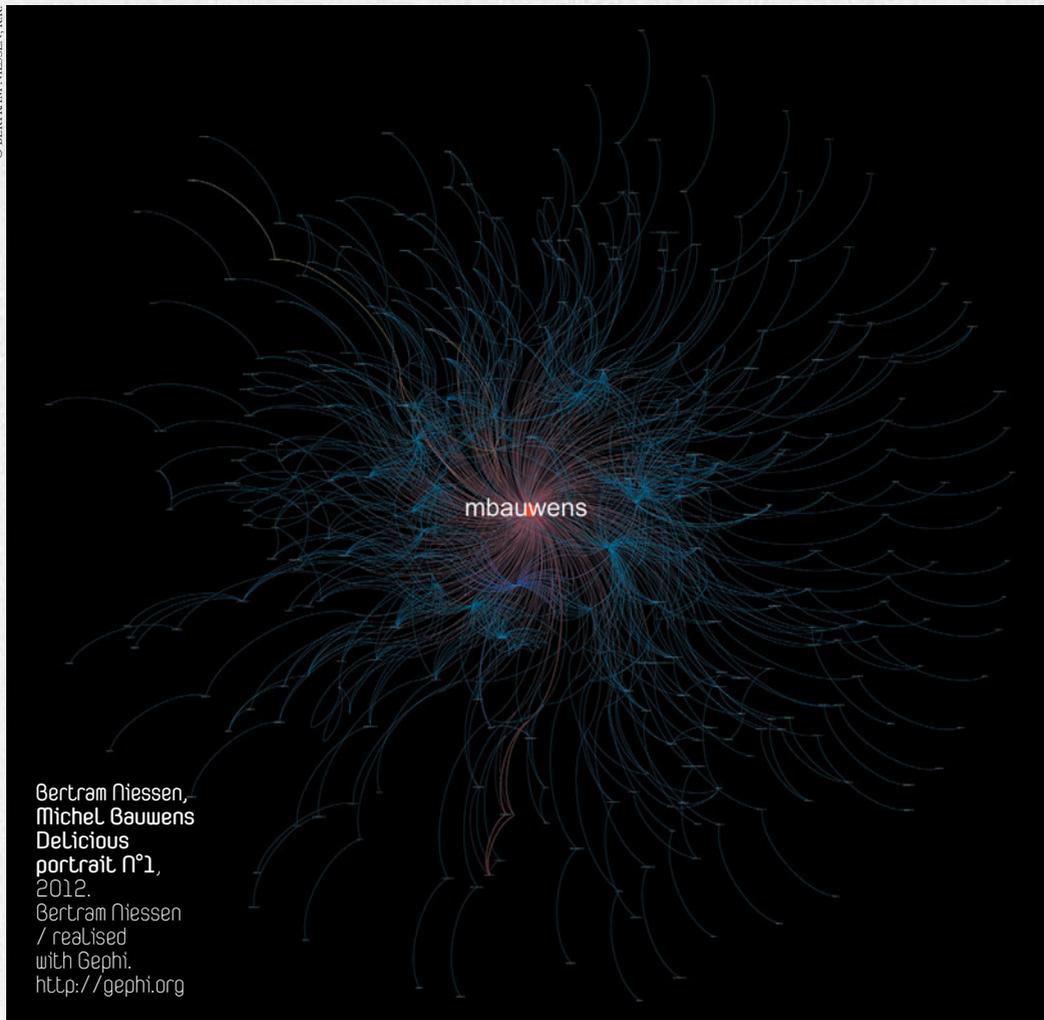
streaming, such as for example Digg used to be (I used past tense as I haven't checked out any progress since 2-3 years). If the majority of your peers are teenage geeks, then obviously different things will bubble up. So I'm still looking for methods that would allow more fine-grained affinity filtering. But in general, I do feel that individual and collective creativity condition each other, so I'm very positive about what the internet has enabled in collective human dialogue and problem solving.

The last question is simple but the answer is probably not. What to do? With different approaches, your views ask Web users for personal commitment to face the rise of new digital inequalities. What do you think are the best practices to organize and get involved?

Geert Lovink: Let's deal with the list of obvious answers first—and then try to overcome them. In terms of the role of social media in new political mobilizations, this is kind of obvious and a no-brainer. There are parts of the world that are highly connected, with obscenely dense cultures of use where nothing will ever happen in terms of a 'Facebook revolution', simply because mass conformism can only express itself in individualized consumerism. The only possible riot that can happen there is during the launch of a new product. >



Bertram Niessen,
Geert Lovink
portrait n°1,
2012.
Bertram Niessen
/ realised
with Gephi.
<http://gephi.org>



Bertram Niessen,
Michel Bauwens
Delicious
portrait n°1,
2012.
Bertram Niessen
/ realised
with Gephi.
<http://gephi.org>

➤ It is easy to make the obvious statement that the 'true' revolution will be offline and breast-to-breast in terms of communication. How romantic. This is what we all want. It is the tourist state of exception. The political reality is probably much more messy. People will use whatever tool to gossip and conspire, instead of time and again looking for the ideal, clean and pure channel in which our revolutionary desires can team up and multiply without being monitored and filtered by the Powers to Be. We should distinguish between a medium as discursive platform and one that is used for organization and coordination. Ideally, we bring the two together as the ultimate site where discussion and mobilization are happening at the same time, a one-stop shop for all your politics and desires. If you look at the Occupy movement it becomes obvious that the internal telecommunication politics no longer is the central issue, neither is the image/representation in the so-called mainstream media for that matter. Many say that 'Oakland' is the limit here, and I agree. The potential of a 'general strike' is becoming within our reach (again), as is organizing through the model of the political party (think of the various pirate parties). Right now we're leaving behind the Northern winter of 2011/12 and we'll have to see

what is left of the Occupy movement both in terms of a concept and a practice. Whether a small block of land was occupied proved not all that important in the end. The question is: can people brought together cause controversy? Occupy as a meme proved a powerful mobilization vehicle to bring people together in search for alternatives to neoliberal policies in education, finance, housing etc. It might be hard over time to speak of success or failure in this context. **Michel Bauwens:** The key issue for me is the following: this system has or is reaching its ecological and social limits, and needs replacement. Because of this, emancipatory forces need to build an integrated counter-economy, that is, less 'against' the system, than 'for itself'. The era of sole resistance is over, we are entering the period of full reconstruction of an alternative 'post-civilization'. My strategy is to create peer communities that construct shared objects through shared innovation commons (which are global-local and language/culture specific if need be), to create services around this offering if it is a knowledge oriented activity; and to associate with distributed manufacturing ecologies where possible, taking advantage of the distribution of physical and financial capital. The next step is to create 'phyles', community-oriented business entrepreneurial coalitions

that do not use a profit-maximizing shareholder form, but a ethically-inspired open company format (think the Economy of Communion network of the Focolare movement, or the Thai Impaeng Network), using Dmytri Kleiner's 'peer production license' to keep the value in the commons, and so insure the social reproduction of the commons economy.

In terms of communication, while we should keep communicating with the people wherever they are, commons organizations should organize their own infrastructure, and cooperate to create a global and distributed darknet that can serve as an alternative. All of this needs to be combined with the construction of a global movement, for which Occupy is in my opinion a great model, since it functions as a global Open API that can be locally adapted to specific needs. In this way we combine our local and affinity-based micro-interests in search for global common struggles that can affect the balance of power and create more space for alternative world-building. ■

interview by **Bertram Niessen**

Geert Lovink is a Dutch researcher and activist who in the last fifteen years elaborated some of the crucial critical concepts used to reshape the meaning of political action in and around the Web and the media. He was one of the main contributors to the development of the "tactical media" theory and practice - the use of pragmatic and temporarily disturbing political interventions by artists, hackers, activists, critics and journalists inside the mainstream media sphere. Lovink is author of many seminal books and articles, and he is involved in the creation of some crucial organizations of cyber-activism and research on the Web and in the social sphere, such as Nettime and The Institute of Network Cultures (which he directs).

Michel Bauwens is a Belgian theorist and activist in the field of peer-to-peer, decentralized and top-down organization. Bauwens' activity revolves around the Foundation for Peer-to-Peer Alternatives, a global network of researchers that explores practices of peer production, mapping and analyzing new forms of political, social and economic governance. His on-line works *Peer to Peer and Human Evolution* and *The Political Economy of Peer Production* are some of the keystones of the contemporary approaches to self-organization through digital media.

AN INTERVIEW WITH PHILIPPE AIGRAIN

THE COPYRIGHT PARADOX

PHOTO © R.R. (CC) MARIE-LAN NGUYEN



Philippe Aigrain
@ Journée
du Domaine
Public, Paris,
2012.

■ Contemporary Internet is characterized by a constant flourishing of new platforms, ways of communications, advocacy groups and informal aggregations of practices. You are a digital freedom activist since the very beginning of the Web. So, first of all I would like to ask you some considerations about the state of the art in cyber rights. What main trends do you identify?

Let me make a small detour. The explosion of practice, of tools, of public expression and creative works is so gigantic, that one has to be very modest when trying to characterize it. Even in domains that I follow in detail, every day I find new forms of creative activity, new communities of knowledge and cultural sharing, new technical or scholarly approaches, new individuals with a very personal, very singular way of addressing issues. They have been there for a while and I did not know it. For each of us, the unknown Internet is a much bigger realm than the small part we know.

Digital activism and cyber rights can be understood only with this background in mind. If we look at the big conflicts regarding rights on the Internet, one can say that they oppose those who are ready to live in this world of diversity and multiplicity, and try to make it a good place to live in, and those who would like to re-simplify the world so it looks like the world of the TV era and dominant cultural industry, with a limited number of sources of expression, a limited set of professional artists, and with a professional class of politicians and business leaders. The problem is that the second side of

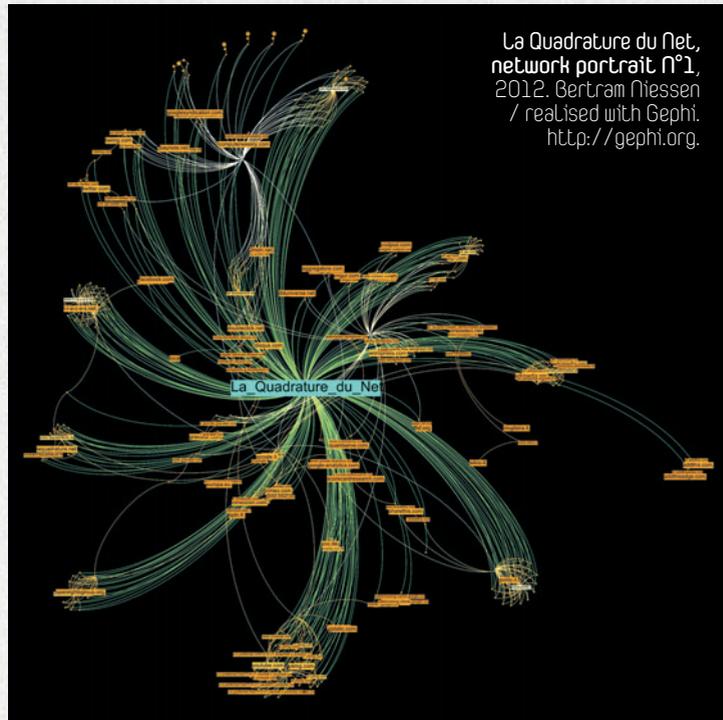
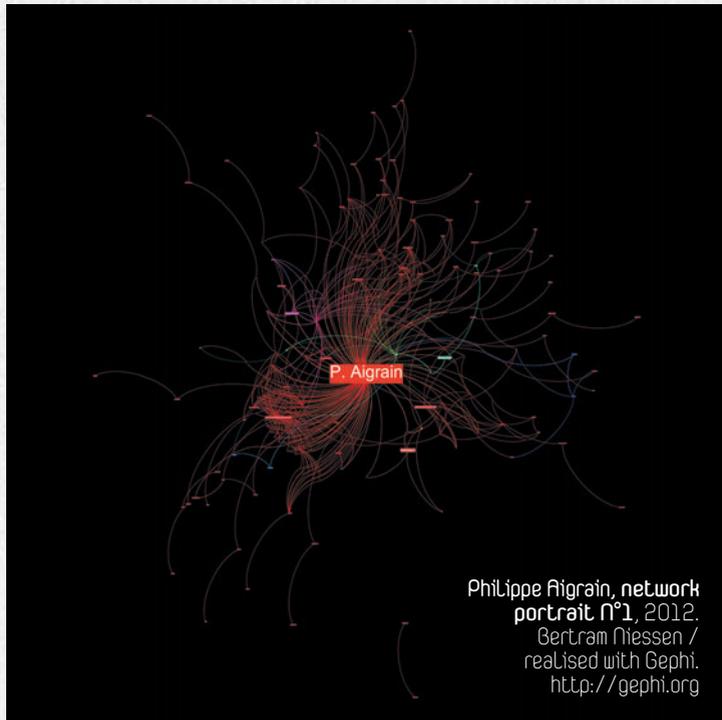
the coin - the world of broadcast and oligarchic corporate-influenced government - is very much alive.

We may feel ourselves to be citizens of the Internet age, with multiple identities and affiliations, a debutant amateur in some domains, an active contributor in others, and maybe once in a while producing something truly appreciated by many. But there are powers in place that find a world of this type very unsafe for them. Actually, they may be wrong in some cases in the sense that there is a place for centralized media in a distributed world, there is a place for political power in a world of active citizens, but the fact that they don't know how to build this place makes them very aggressive.

Now, finally addressing your question, digital activism is just like the rest of the Internet: it comes in many flavors, from small groups producing information or ways to coordinate for many people (like La Quadrature du Net) to groups that organize in a much more horizontal manner like the Anonymous galaxy or constellation. But all together, we still have a challenge to face. We know how to unite many people against repressive laws or the proprietary capture of common knowledge or culture. We know how to build concrete alternatives from free software to voluntary sharing of cultural works, from P2P networks to knowledge sharing communities or even alternative telecom networks and hardware. However, when we need to create new social institutions, new society-wide policy or a better economic organization, we are more divided.

Workers in the creative economy are trapped in a copyright paradox: especially when they are young, in order to be "smart" and "creative" they need to consume enormous amounts of immaterial goods - music, e-books, movies and other artworks - and to train with always new software; but the economic system in which they are rooted is not able to provide enough wealth to buy everything, somehow forcing them to become illegal downloaders. What intellectual property reforms are needed to solve this situation?

We need a paradigm change, at least for sharing on the Internet. We must go from "you access what you can buy" to "you share in culture and you contribute to it". The way this translates in a copyright reform is: we must put the non-market (not-for-profit) practices of individuals where they belong, where they were in the era of books and records, that is, beyond the copyright arm. Once someone has acquired a copy of a digital work, sharing this work with other individuals without aim of profit and without centralization of contents should not be the object of restrictive (exclusive) rights. Now this raises an issue of how we are going to make the giant creative activity that occurs in the digital sphere sustainable in this context, where non-market sharing is recognized as a right. I believe that the complement to this right to share is the duty to contribute all to the existence of creative activities, not because sharing would hurt them, but because the sharable works constitute a common resource for all. We will come back to this in another question. ➤



© BERTRAM NIESSEN, D.E.

➤ You are a co-founder of La Quadrature Du Net. Your struggle for net neutrality and against censorship is one of the most interesting examples of European digital activism. Can you outline the main actions you pursued? What's coming next?

La Quadrature du Net is active both at the French National level and at international, mostly European, level. We are also part of an informal network of similar organizations in other countries or internationally (EDRi, OpenRights, Bits of Freedom, Scambio Etico, the Chaos Computer Club, Knowledge Ecology International, Telecomix, to name a few). In the first years (2008-2009) we were mostly focussed on fighting HADOPI in France and avoiding the hijacking of the telecom regulation by copyright interests at the European level. Since 2010, we are mostly active to defend and promote network neutrality and against a very complex tangle of repressive enforcement: ACTA of course, but also the revision of IPR Enforcement Directive and the Information Services Directive, and all the soft law circumvention of the democratic law-making and judiciary decision (administrative filtering or domain-name seizure, pressure on intermediaries, etc.). In parallel, Simultaneously, we always developed constructive policy proposals for the recognition of sharing and new cultural financing schemes, for having better independent data for policy-making, for effective network neutrality policies, etc.

In your recent book, "Sharing. Culture and the Economy in the Internet Age" (Amsterdam University Press, 2012,

<http://www.sharing-thebook.com>), you summarize the debate on digital commons vs. piracy. You also examine new possible financing systems that link the monetary economy to the non-market commons. What are the main sustainable finance schemes that are suitable for independent initiatives in art, music and design?

In a new situation where sharing will be recognized, we can start addressing the real challenge of digital creativity: that there are many more creative people at every level of competence and quality. The classical commercial economy of public performance (concerts, theater viewings), of services (teaching, mediation) or of sales of contents will not go away. Neither will public subsidies or the fact that some activities can take place simply because we have some basic ability (constructed by education) and free time.

But if we want young creative workers (and each of us) to become better at what they want to do, to be able to invest more time in it, we need additional new financing schemes. A big part of it can be voluntary with participative financing Kickstarter-style. But when you look at the scale of the needs, compulsory, society-wide pooling of resources is also necessary. The big difference is that it can be flat-rate with reasonable amounts in the 5€ per month per broadband Internet subscriber range (or progressive if one thinks it is needed), and that it is disconnected from the rights to share (no control needed). There are many issues for implementation and governance of the scheme that I have discussed in my

book, but they are manageable. A core principle is that the contributors (individual Internet users) should be empowered to decide how the collected sums will be used to finance new works or projects and to remunerate the contributors to works that have been shared. For the former it will be based on their preferences (allocation to competing organizations and projects). For the latter (remuneration) on the provision by voluntary users of anonymous data about their sharing practices. ■

interview by Bertram Niessen

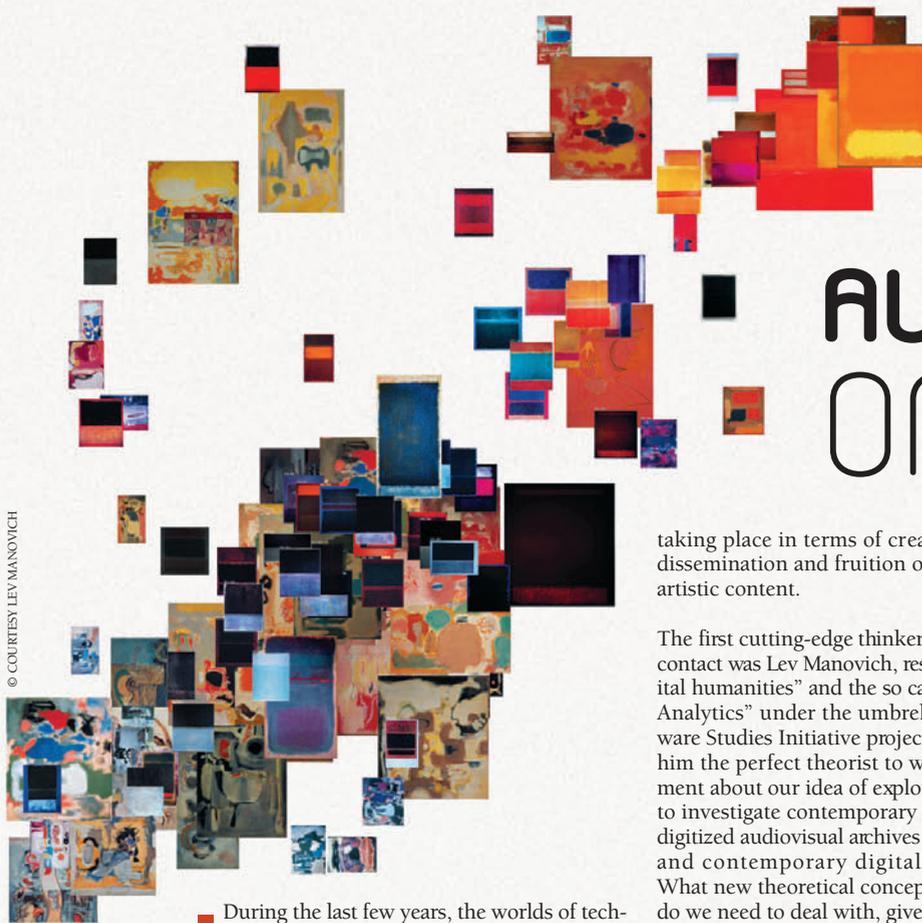


TO READ:

Philippe Aigrain, *Sharing. Culture and the Economy in the Internet Age* (Amsterdam University Press, 2012, www.sharing-the-book.com)

Philippe Aigrain is a French researcher and activist of the Free Software Movement. His seminal work during the '90s contributed to the development of the European Union guidelines for the free software policies. He is administrator of the Software Freedom Law Center – an organization that offers pro bono legal representation to not-for-profit developers of free and open source software – and warrantor of the NEXA Center for Internet and Society. Aigrain is also the co-founder of "La Quadrature du Net", a French organization for the defense of rights on the Internet that plays a major role in the national and international struggle against restrictive copyright laws and treaties such as HADOPI and ACTA.

© COURTESY LEV MANOVICH



Rothko color experiment.
Visualization of a set of Mark Rothko paintings which use color quantization of paintings' colors. Each painting is reduced to 2 key colors; and the values of these two colors are plotted on X, Y.
Visual by Lev Manovich.

■ During the last few years, the worlds of technology and communication have been marked by the emergence of the open access, peer-to-peer and open source. Known as "digital commons", these free and open source kind of production and distribution phenomena are affecting cultural and artistic practices in the broad sense.

Today, defining the scope of this revolution in the world of contemporary visual art production, may be a very complex bid. We're just beginning to discover the possibilities of video delivery platforms, of the digitization of historical audiovisual archives, of participatory networks of production and peer to peer sharing of copyrighted content. Moreover, spread of free licenses (copyleft) raises questions about the redefinition of the concept of authorship, intellectual property and artistic heritage, not only for artists and curators but also for archives and research centers and institutions.

This audiovisual section aims to trace possible paths within a vast and evolving landscape, aiming to outline some of the changes

taking place in terms of creation practice, dissemination and fruition of audio-visual artistic content.

The first cutting-edge thinker we decided to contact was Lev Manovich, researching "digital humanities" and the so called "Cultural Analytics" under the umbrella of the Software Studies Initiative project. We consider him the perfect theorist to write and comment about our idea of exploring new ways to investigate contemporary culture, using digitized audiovisual archives (art, film, etc.) and contemporary digital commons. What new theoretical concepts and models do we need to deal with, given the new scale of contemporary audiovisual production? How can the use of computational techniques and massive cultural data sets, applied to audiovisual contents, develop a cultural theory for the 21st century?

However, we were also interested in reflecting on this subject from both a cultural and (or mainly) an artistic viewpoint. Art mirrors our society and culture, so we were wondering how Manovich's studies can equally improve the descriptions of cultural artifacts and processes, as well of artistic productions, aesthetics and languages. In other words, we were interested in how Cultural Analytics shares ideas and approaches with visual analytics and visual data analysis, defined as follows: *I never saw data visualizations of artworks. Maybe, it could be something interesting, especially for those sharing on the internet, accessing openly and peer-to-peering...*

The second text we propose is an interview to Kenneth Goldsmith, founder of the online archive for experimental films and audiovisual artworks Ubuweb, a large web-based

AUDIOVISUALS ON THE NET

educational resource for avant-garde material available on the internet. The idea was to focus on what we consider one of the best examples of online content archive, out of any commercial market or institutional implementation strategy. Some questions arose, as a result of a long critical discussion that you can read in the introduction to this interview: how has the project adapted to recent Internet developments, in terms of new distribution strategies, web 2.0 dynamics of access to knowledge and quality contents? How can Ubuweb distribute such a big amount of free video and audiovisual contents without any restriction? Is this a reliable model or a unique case study? And, finally, how much are the artists themselves (or producers and distributors) involved in the decision making process, considering important issues such as the quality of the digital material, the strategies of online distribution and intellectual property in the Web 2.0 era?

The final text, a contribution by Sonia Campanini and Luciano Palumbo tries to go beyond these questions, giving the readers a recent example of a commissioned institutional project, involving web sharing and distribution strategies, internet of things community dynamics, and playful online and offline sharing of audiovisual contents. The *BarCode* Project produced by Arte & National Film Board of Canada features the work of 30 unknown directors, 100 shorts films that decipher everyday objects, inviting users to engage with them for free through Internet and I-phone apps. We're just beginning to discover what there is just around the corner... ■

Claudia D'Alonzo & Marco Mancuso

HOW TO SEE 1,000,000 IMAGES?

Early 21st century humanities scholars, critics and curators have access to unprecedented amounts of visual media – more than they can possibly study, let alone simply watch, or even search.

■ How to work with massive image collections?

A number of interconnected developments which took place between 1990 and 2010 — the digitization of many analogue media collections, the rise of user-generated content and social media, the adoption of the web as media distribution platform, and globalization which increased the number of agents and institutions producing media around the world — led to an exponential increase in the quantity of media while simultaneously making it much easier to find, share, teach with, and research them. Millions of hours of television programs already digitized by various national libraries and media museums, four million pages of digitized U.S. newspaper pages from 1836 to 1922 (www.chroniclingamerica.loc.gov), 150 billion snapshots of web pages captured from 1996 (www.archive.org), and trillions of videos on YouTube and photographs on Facebook and numerous other media sources are waiting to be 'dugged' into.

How can we efficiently explore massive digital image collections to ask interesting questions? The examples of such collections are 167,000 images on the Art Now Flickr gallery or 176,000 Farm Security Administration/Office of War Information taken between 1935 and 1944 and digitized by the Library of Congress. How can we work with such image sets? The basic method used by media researchers when the amounts of media was relatively small – see all images or video, notice patterns, and interpret them – no longer works.

Given the size of typical contemporary digital media collections, simply seeing what's inside them is impossible even before we begin formulating questions and hypotheses and selecting samples for closer analysis. Although it may appear that the reasons for this are the limitations of human vision and human infor-

mation processing, I think that it is actually the fault of current interface design. Popular interfaces for accessing digital media collections such as lists, image galleries, and image strips do not allow us to see the contents of a whole collection. These interfaces usually only display a few items at a time, regardless of whether you are in a browsing mode, or in a search mode. Because we are not able to see a collection as a whole, we can't compare sets of images or videos, notice patterns of change over time, or understand parts of the collection in relation to the whole.

Against Search: How to Look without Knowing What you Want to Find

The popular media access technologies of the 19th and 20th century — slide lanterns, film projectors, Moviola and Steenbeck, record players, audio and video tape recorders, VCR, DVD players, etc. — were designed to access single media items at a time at a limited range of speed. This went hand in hand with the organization of media distribution: record and video stores, libraries, television and radio broadcasters only make available a few items at a time. At the same time, hierarchical classification systems used in library catalogues and rooms encouraged the users to access a collection in ways defined by classification schemes, as opposed to browsing at random. When you looked through a card catalogue, or physically walked from shelf to shelf, you were following a classification based on subjects, with books organized by author names inside each subject category. Thus, although a single book itself supported random access, the larger structures in which books and other media objects were organized did not.

Together, these distribution and classification systems encouraged 20th century media researchers to decide beforehand what media items to study. A researcher usually started

with a particular person (a filmmaker, a photographer, etc.) or a particular subject category (for example, *1960s experimental American films*). In doing that, a researcher could be said to move down the hierarchy of information in a catalogue and then select a particular level as the subject of her project: cinema > American cinema > American experimental film > American experimental film of the 1960s. The more adventurous would add new branches to the categorical tree; most were satisfied with contributing individual leaves (articles and books). Unfortunately, the current standard in media access — computer search — does not take us out of this paradigm. Search interface is a blank frame waiting for you to type something. Before you click on the search button you have to decide what keywords and phrases to search for. So while the search brings a dramatic increase in speed of access, its deep assumption (which we may be able to trace back to its origins in 1950s "information retrieval") is that you know beforehand something about the collection worth exploring further.

To put this in another way: search assumes that you want to find a needle in a haystack of information. It does not allow you to see the shape of the haystack. If you could, it would give you ideas of what else there is worth seeking, beside the needle you originally had in mind. Search also does not reveal where all different needles in the haystack are situated, i.e. it does not show how particular data objects or subsets are related to the complete data. Using search is like looking at a pointillist painting at a close range and only seeing colour dots, without being able to zoom out to see the shapes.

The hypertext paradigm defining the World Wide Web is also limited: it allows navigation of pages around the web according to the links defined by others, as opposed to moving in any direction. This is consistent with the original vision of hypertext as articulated by Vannevar Bush in 1945: a way for a researcher to create *trails through massive scientific information and for others be able to follow his traces later*.

Based on my informal review of some of the largest online institutional media collections available today such as europeana.org, archive.org, the U.S. Library of Congress digital collections, and atstor.org, a typical interface offered to the users allows browsing through a collection linearly or by hierarchical categories and subject tags, and searching using metadata recorded for media objects. In all cases, the categories, tags, and metadata were inserted by the archivists (none of the sites I reviewed offered user-generated tags.) As a result, when a user accesses institutional media collections via their websites, she can only move along a fixed number of trajectories defined by the

taxonomy of the collection and types of meta-data used in describing the data.

In contrast, when you observe a physical scene directly with your eyes, you can look anywhere in any order. This allows you to quickly notice a variety of patterns, structures and relations. Imagine, for example, turning the corner on a city street and taking in the view of the open square, with passersby, cafes, cars, trees, advertising, store displays, and all other elements. You can quickly detect and follow a multitude of dynamically changing patterns based on visual and semantic information: cars moving in parallel lines, houses painted in similar colours, people who move along their own trajectories and people talking to each other, unusual faces, shop windows which stand out from the rest, etc.

We need similar techniques which would allow us to observe vast "media universes" and quickly detect all interesting patterns. These techniques have to operate with speed many times faster than the normal playback speed (in the case of time-based media). Or, to use an example of still images, I should be able to see important information in one million photographs in the same time it takes me to see a single image. These techniques have to compress massive media universes into smaller observable media "landscapes" compatible with the human information processing capacity, while at the same time keep enough of the details from the original images, video, audio or interactive experiences to enable the study of the subtle patterns in the data.

Media Visualization

The limitations of the typical interfaces for online media collections also hold for interfaces for desktop and mobile applications for media viewing, cataloguing, and editing, and media hosting sites. Like dedicated online collection sites, media managers and hosting sites allow users to browse and search images and video, displaying the results in various formats. Their usefulness as research tools, however, is quite limited. Desktop applications such as iPhoto, Picasa, and Adobe Bridge, and image sharing sites such as Flickr and Photobucket can only show images in a few fixed formats — typically a two-dimensional grid, a linear strip, a slide show and, in some cases, a map view (photos superimposed on the world map). Images are usually sorted by upload dates; to display photos in a new order, a user has to invest time in adding new metadata to all of them. She can't automatically organize images by their visual

properties or by semantic relationships, compare collections that may have hundreds of thousands of images added to each other, or use information visualization techniques to explore patterns across image sets.

Graphing and visualization tools available in Google Docs, Excel, Tableau, Many Eyes and other graphing and spreadsheet software do offer a range of visualization techniques designed to reveal patterns in data. But these tools too have their own limitations. A key principle, which underlies the creation of graphs and information visualizations, is the representation of data using points, bars, lines, and similar graphical primitives. This principle has remained unchanged since the earliest statistical graphics of the early 19th century to contemporary interactive visualization software, which can work with large data sets. Although such representations make clear the relationships in a data set, they also hide the objects behind the data from the user.

While this is perfectly acceptable for many types of data, in the case of images

and video it becomes a serious problem. For instance, a 2D scatterplot showing a distribution of grades in a class with each student represented as a point serves its purpose, but the same type of plot representing the stylistic patterns over the course of an artist's career via points has more limited use if we can't see the images of the artworks.

Since 2008, my Software Studies Initiative has been developing visual techniques that combine the strengths of media viewing applications, graphing and visualization applications. Like the latter, they create graphs to show relationships and patterns in a data set. However, while plot making software can only display data as points, lines or other graphic primitives, our software can show all the images in a collection superimposed on a graph. We call this method media visualization (or mediavis).

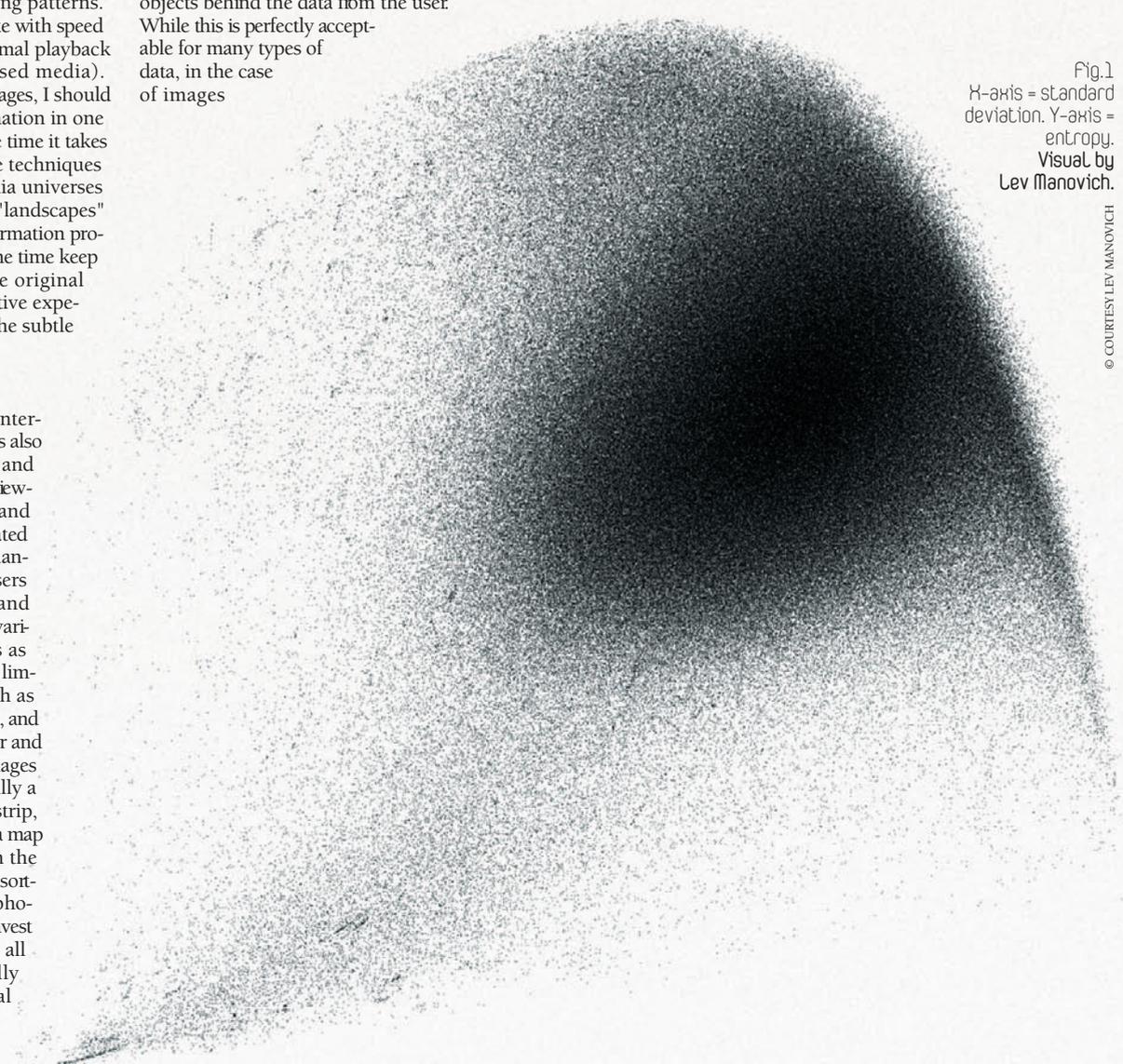


Fig.1
X-axis = standard deviation. Y-axis = entropy.
Visual by Lev Manovich.

© COURTESY LEV MANOVICH

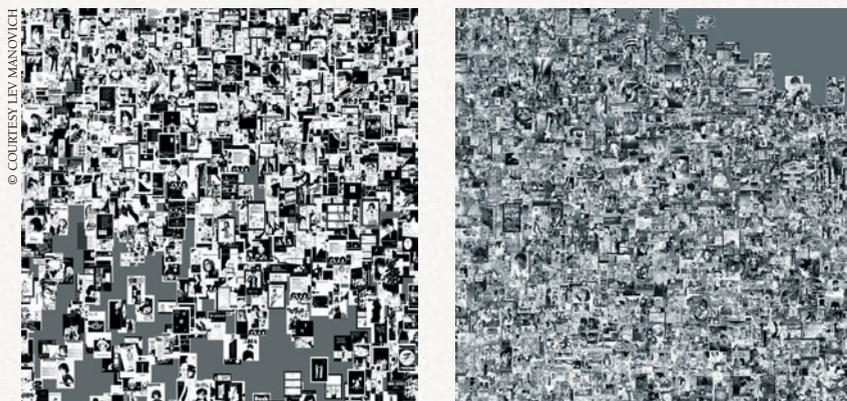


Fig.3 et. 4, Manga / montage (close-ups). Lev Manovich & Jeremy Douglass, 2010.



Fig.2
Manga Style
Space.
Lev Manovich
& Jeremy
Douglass, 2010.
Manga series
from the
scanlation site
OneManga.com.
Total number
of pages:
1,074,790.

Typical information visualization involves first translating the world into numbers and then visualizing relations between these numbers. In contrast, media visualization translates a set of images into a new visual representation, which can reveal patterns in the images. In short, pictures are translated into pictures. The following two visualizations of the same data set illustrate the differences between infovis (information visualization) and mediavis (media visualization). Both visualizations use familiar scatter plot technique; however the second adds images on top of the points. The first visualization shows the distribution of the data; the second allows us to understand what is behind the points. The data for these visualizations are 1,074,790 manga (Japanese comics) pages. The first visualization represents each page as a point [Fig.1]. The second visualization uses the scaled copies of the pages instead of the points [Fig.2]. To produce these visualizations, we have measured a number of visual characteristics of each page: contrast, number of lines, texture properties, etc. We then use one of the measurements to position the data on the X-axis, while another measurement is used to position data on the Y-axis. This method allows us to organize images according to their visual characteristics along two dimensions. In this visualization, the pages in the bottom part of the visualization are the most graphic and have the least amount of detail and texture. The pages in the upper right have lots of detail and texture. The pages with the highest contrast are on the right, while pages with the least contrast are on the left. In between these four extremes, we find every possible stylistic variation. To make this easier to see, we include two close-ups of the bottom part and the top parts [Fig.3-4]. What do we learn from this visualization? It suggests that our basic concept of “style” may be not appropriate then we consider large cultural data sets. The concept assumes that we can partition a set of cultural artifact works into a small number of discrete categories. In the case of our one million pages set, we find practically infinite graphical vari-

ations. If we try to divide this space into discrete stylistic categories, any such attempt will be arbitrary. Visualization also shows which graphical choices are more commonly used by manga artists (the central part of the “cloud” of pages) and which appear much more rarely (bottom and left parts). Our media visualization techniques can be used independently, or in combination with digital image processing. Digital image processing is conceptually similar to automatic analysis of texts already widely used in digital humanities. Text analysis involves automatically extracting various statistics about the content of each text in a collection such as word usage frequencies, their lengths, and their positions, sentence lengths, noun and verb usage frequencies, etc. These statistics (referred in computer science as ‘features’) are then used to study the patterns in a single text, and the relationships between texts, literary genres, etc. Similarly, we can use digital image process-

ing to calculate statistics of various visual properties of images: average brightness and saturation, the number and the properties of shapes, the number of edges and their orientations, key colors, and so on. These features can be then used for similar investigations – for example, the analysis of visual differences between news photographs in different magazines or between news photographs in different countries, the changes in visual style over the career of a photographer, or the evolution of news photography in general over the 20th century. We can also use them in a more basic way — for the initial exploration of any large image collection. ■

Lev Manovich

Lev Manovich is one of the most important theorists in media studies and digital humanities. He is Professor at the Visual Arts Department, University of California - San Diego (UCSD) where he teaches courses in digital art, history and theory of digital culture, and digital humanities. He also directs the Software Studies Initiative at the California Institute for Telecommunications and Information Technology (CALIT2).

He is the author of *Software Takes Command* (Olivares, Milan; English version released under CC license, 2008), *Black Box - White Cube* (Merve Verlag Berlin, 2005), *Soft Cinema* (DVD, The MIT Press, 2005), *The Language of New Media* (The MIT Press, 2001), *Metamediji* (Belgrade, 2001), *Tekstura: russian essays on visual culture* (Chicago University Press, 1993) as well as over 100 articles which have been published in 30 countries and reprinted over 400 times.

Lev Manovich has been working with computer media as an artist, computer animator, designer, and

programmer since 1984. His art projects have been presented by, among others, the Chelsea Art Museum (New York), ZKM, The Walker Art Center, KIASMA, the Centre Pompidou, and the ICA (London).

In 2007 he founded the Software Studies Initiative (www.softwarestudies.com). The lab is researching a new paradigm for Cultural Analytics, a term coined by Manovich to indicate the use of computational methods for the analysis of massive cultural data sets and flows. The goal of the Software Studies Initiative is to develop techniques and free software, applying them to progressively larger image and video sets to better understand how culture works. In addition to the area of digital humanities these techniques can be used in cinema studies, game studies, media studies, ethnography, exhibition design, and other fields.

The Software Studies Initiative at UC San Diego is housed within the UCSD Division of the California Institute for Telecommunication and Information Technology (CALIT2) and the Center for Research in Computing and the Arts (CRCA).



UBUWEB

VIDEO ARCHIVES

IN THE DIGITAL AGE

The issues raised by the audio video archive in a digital age constitute without a doubt one of the most important points of contact between the philosophy of the Open source and audio/video artistic practices. The archive here is understood as a set of systems, methods and experiences in the making for the collection, dissemination and access to knowledge.

■ Needless to say that what links the concepts of open source and archive to UbuWeb is shared by most of those involved in the history of audiovisual experimentation in academia, research, teaching and study or more generally by those who venture into — the too often arduous — search for audiovisual materials that document the history of the avant-garde. While many of the organizations dedicated to the "preservation" of the audiovisual heritage are trying to resolve the apparent conflict between protection of copyright and network dissemination, UbuWeb has made free access and disregard for copyright rules the flag and the instrument of its revolution. The experience of UbuWeb is unique and absolute, as its founder Kenneth Goldsmith reminds us, with emphasis, to the extent that one wonders how it has been possible for the project to survive until the current years. Indeed, it has grown whilst remaining consistent to its original creed.

Kenneth Goldsmith, poet, educator and senior editor for the PennSound project, founded UbuWeb in 1996 to make works of visual and concrete poetry available. This is how the upload of unavailable and out of print content started. Since the beginning, genres and content categories uploaded online have somewhat transcended the boundaries of visual and concrete poetry: the first category to open the way was sound poetry, from this came all the avant-garde music, up to the creation of the "Film" section, which hosts about 7,500 authors and 2500 titles. This mix and hybridization of disciplines is the main feature of the project, committed to foster alchemical relations between music, poetry, literature, film and video, essays and articles. All the published interviews, the large number of information contained on the website and the very manifesto of the project reiterate two fundamental rules: UbuWeb receives neither public nor private funding and disseminates the content without asking permission, because *if we had to ask permission it wouldn't exist*⁽¹⁾. We haven't asked Goldsmith how they manage to achieve this dream common to many supporters of freemove and P2P, because this question has already been asked on countless occasions. It is not hard to find his reply on the net, which essentially is "we just do it". As you will read from his own words, Goldsmith is reluctant to reflect upon and make comparisons between the experience of UbuWeb and the more general discourse of the relationship between archives and open access. In fact, the experience of UbuWeb is an anomaly with respect to both anti-theoretical poles in this area. While UbuWeb is explicitly remote from a traditional audiovisual archive, it appears closer to the dynamics of exchange of P2P, with which it often shares the source of contents. It also shares its free access. Yet, UbuWeb is also quite different from P2P.

UbuWeb does not respect the horizontal structure that characterizes P2P exchange, but follows a top-down one-way design, setting up a modality of transmission of knowledge according to a one-to-many distribution.

Sharing for UbuWeb is indeed a gift⁽²⁾, but in a way that contradicts the one outlined by Marcel Mauss⁽³⁾: It neither allows nor aims at building a relationship, it even denies any opportunity to respond to its offer. The gift of UbuWeb recalls the reading of the gift given by Derrida⁽⁴⁾: *for there to be a gift, there must be no reciprocity, return, exchange, counter-gift, or debt. If the other gives me back or owes me or has to give me back what I give him or her, there will not have been a gift, whether this restitution is immediate or whether it is programmed by a complex calculation of a long term deferral or difference*⁽⁵⁾.

According to this formulation, the gift represents one of the most radical forms of disruption in the market economy, because of the elimination of its very relation of exchange. In this framework UbuWeb plays a particularly important role with respect to one of the most problematic aspects of open source production. Although appearing as innovative strategies, open source production is included and thus continues to be dependent upon the frames of market and exchange characteristic of the capitalist economy. If the market sets the value of cultural goods, then the role of UbuWeb is to preserve objects that have either escaped, been rejected, or dispersed in the market limbo (out of prints or never published artworks), and operates in a very similar fashion to that of the free shops, in which goods are donated, losing their economic value but maintaining their use value. ■

Claudia D'Alonzo & Marco Mancuso

(1) Joanne McNeil, *Kenneth Goldsmith* (Frieze Blog, April 20, 2010), <http://blog.frieze.com/kenneth-goldsmith/>

(2) Gianfranco Maraniello, Sergio Risaliti, and Antonio Somaini, *Il Dono/The Gift*, (Charta, Milan, 2001).

(3) Marcel Mauss, *Essai sur le don. Forme et raison de l'échange dans les sociétés archaïques*, in *Sociologie et anthropologie* (PUF, Paris, 1950); *Gift, Gift, in Mélanges offerts à Charles Andlers par ses amis et ses élèves* (Strasbourg, Istra, 1924), published also in Marcel Mauss, *Œuvres*, vol. 3, *Cohésion sociale et division de la sociologie* (Minuit, Paris, 1969).

(4) Jacques Derrida, *Given Time I. Counterfeit Money* (Chicago & London: University of Chicago Press, 1992 [1991]), p. 8.

(5) *ibid.* p.12.



Kenneth Goldsmith.

> KENNETH GOLDSMITH INTERVIEW

Claudia D'Alonzo, Marco Mancuso: UbuWeb was born 15 years ago. Looking back at these years of activity. How has the project changed and what are the possible future developments...

Kenneth Goldsmith: Very little has changed. UbuWeb pretty much does what it did then: distribute works of the avant-garde to anyone around the planet for free. The future holds more of the same. Perhaps a new section will open here and there, but we have no plans to change anything.

UbuWeb, and its web-based archive, couldn't exist without the Internet. The project itself was born just after the birth of the Internet. So, how has the project adapted to the huge online transformations during the last few years, especially those pertaining to sharing methods and accessing ideas and knowledge?

UbuWeb was never dependent on cloud-based servers. Our servers are stable and transparent, donated by an art school in Mexico City. So when you download something from UbuWeb, you get an AVI or MP3 file without captchas, without waiting times, without payment, all of those things that Megaupload made their fortunes from. I feel very badly for the many people who built

wonderful MP3 blogs and assumed that Megaupload would always be there. I can understand why they did it, but in commercial culture, there is always a price to pay. Nothing is free. Finally, for Megaupload users the bill came due.

What are your relationships with institutional archives in the USA and worldwide? Have you ever faced each other, and have you ever tried to learn how they perceive you? Any chances of collaboration?

The only institutional archives we collaborate with in the USA are PennSound and the Electronic Poetry Center at the University of Buffalo. The EPC was born around the same time and we've been partners ever since. PennSound is really the permissioned and legitimate side of UbuWeb: much of our materials are stored on PennSound servers. The sort of works that UbuWeb is interested in is only shared by a very small audience, thus there really isn't any competition or confrontation; no one seems to want them except for us.

In the last few years, institutional audiovisual archives have been mainly concerned about Internet methodologies and strategies of project implementation to disseminate their estates online; many projects were

born among European and North American institutions to create new networks and platforms. Contents are often not freely accessible (institutional account or VOD access are needed), some institutions have even recently been charging users for viewing (like NIMH in Amsterdam). UbuWeb is quite the opposite: it was born as an archive, directly on the Internet, had free content sharing and access, filling a big hole in the circulation of the international audiovisual heritage. So, what are the similarities and differences between UbuWeb and the institutional archives, in terms of the sharing process of online material?

Since we are independent, we have no one to please but ourselves. We make it up as we go along. The one thing we insist on is free and open access for all. I'm not sure why these institutions can't do the same, but we refuse to firewall anything. PennSound, which is run by the University of Pennsylvania is the exception: they have an ethos identical to UbuWeb. UbuWeb believes in shared culture and is against copyright and money. We have nothing to gain and we also have nothing to lose. This is freedom. And this utopia is much more interesting than any artefact or content we can ever host. This is really the secret agenda of UbuWeb.

Let's talk about UbuWeb's users. How does the platform create and regard feedback with users? Does a real community exist in terms of feedback? Have you ever thought about offline events, about exporting content from the Internet, sharing content through physical meetings?

UbuWeb is not a democracy That's why it is so good. We believe that in a time when everything is available, what counts is filtering and curating. Thus, it is very difficult to get your works shown on Ubu. Everything goes through a thorough vetting before it goes on the site. If you want democracy, go to archive.org or YouTube. If you want community, go to Facebook. We have nothing to do with community. Again, we have no one to please but ourselves and are not really interested in hearing what anyone thinks of our site. Why would we move to the inadequate and limited scope of physical meetings when we have the internet, the best distribution system going? It seems to be working very well as it is.

The creation of methodologies for sonic & audiovisual – analogue to digital formats – contents migration has been operational for a long time in media art/time-based art archiving. What methods are being used by UbuWeb to digitize audiovisual & sonic contents and why? Are there any labs or reference institutions taking care of the clearance for you?

These days, we mostly repost things that are floating around private file-sharing groups to which only a small number of people have access. We act like Robin Hood, taking from the few and giving to the many. There's so

much out there, that we don't need to rip anything new, thus alleviating the need for labs, institutions or money.

Do you have any contact and feedback from artists regarding your way of operating? Many preservation projects consider artists' relationship as vital...

No. We're not interested in hearing feedback from anyone including artists. If anyone doesn't like what is on UbuWeb or the way it is done, they are welcome to go somewhere else and see it or better yet, to make a better version. No one is stopping anyone from doing this. Nor are we interested in preservation in a serious sense. A real institution like MoMA should be doing preservation. Ubu is an eccentricity, an unreliable archive, one based on whim and intuition, it's a wunderkammer, a hobby, a farce. Its beauty is its fragility, its ephemerality. One day, MoMA or someone official will do UbuWeb correctly and put us out of business. We look forward to that day.

UbuWeb can be considered a sustainable online model, even without institutional funding, administration money or commercial-free. But, as you said many times, UbuWeb

could vanish for any number of reasons: ISP could pull the plug, the universities support could dry up, or some new copyright infringements laws could interfere. Should the website vanish/close down it would be a tremendous loss for the audiovisual heritage and would turn the work of contributors, supporters and volunteers of the last years into a waste of time. So, have you ever thought about a different and new strategy to survive in the future? Maybe including some web 2.0 new economical crowdfunding and networking strategies?

I would rather shut UbuWeb down than beg for money or make a Kickstarter. That's the point in which we say goodbye, it was fun while it lasted. The web is ephemeral and things disappear all the time. Enjoy UbuWeb while it is here and make sure you download everything now or you'll regret it when the site is gone.

Speaking of copyright infringements, UbuWeb exists in what you call "the grey zone": the contents you publish are outside of the commercial market and the market itself does not seem interested in them. UbuWeb seems to be the proof of how

piracy and copyright concepts are not connected to State Laws but more to economic interests that lie in the circulation and access of online culture. So, how do you work and live on the unsteady border of copyright infringement/violation on one hand, and market interests on the other? Do you think UbuWeb could be regarded as a system error for emerging idiosyncrasies in the copyright concepts currently purported by laws?

We are not on a border because there is no market for the things we distribute. If you try to release them — and many people have — you'll find that you will lose money and grow bitter. The nature of these works is that they wish to be in free circulation. It's important to note that there are many different types of economies. Lady Gaga has a multi-billion dollar business. She'd be crazy not to protect that. UbuWeb respects these other types of economies, it just so happens that they have nothing to do with what we do. UbuWeb, like most art, is an aberration, a freak show, an exception to the rule; it is not the rule itself, nor should it ever be mistaken for such. ■

Interview by Claudia D'Alonzo & Marco Mancuso

MORE INFO:

UbuWeb:
www.ubuweb.com/

Kenneth Goldsmith
 @ Street Poets and Visionaries,
 Mercer Union,
 Toronto,
 2009.



PHOTO © C. JONES.

CONVERSATION WITH NFB PRODUCER HUGUES SWEENEY

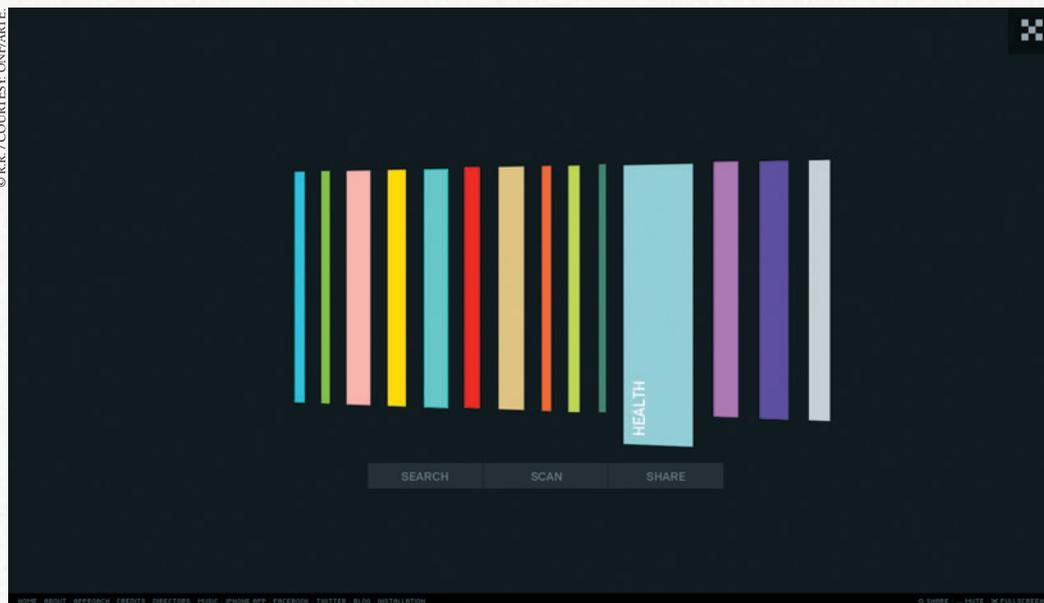
IF THINGS COULD TALK: THE OPEN SIDE OF OBJECTS

We are queuing at the supermarket. Inattentively we are waiting for our turn surrounded by the unmistakable symphony of electronic sounds produced by several barcode scanners at work during peak time. And it comes into our minds all the time that we had to confront ourselves with someone who, during a coffee talk, has blamed us all for being slaves of objects.

with us, Hugues Sweeney, the NFB executive producer heading the project, explains this concept as follows: *We spent three days brainstorming and one idea that kept coming around was the idea of a footprint; the trace that things leave behind; and also the idea of rooting the concept from the point of view of the users - where they are, the place they're in, what surrounds them, etc. We wanted the narrative to deploy from their perspective - something the creator doesn't control. And we discussed a lot about objects: what they mean, stories and significance they hide. How much can an object tell you about corruption, for example? But also about death, relationships, the world we live in. The other thing is that we wanted to extract the experience from the screen, to explore a relationship between the project and the user that would happen outside a browser or a tv - an experience for the people to view their surroundings differently. [...] The barcode is at the origin of the project. It's the metaphor [...], a cold and universal symbol that becomes the key to release the stories.*

The multimedia platform consists of a website (<http://codebarre.tv>), an iPhone application and a gallery installation. The website structure immediately creates an empathic relationship between users and scanned objects: an intuitive interface, essential design, minimal music. *Choose one object, scan its barcode, watch a film* is the basic narrative of the platform. Users can search objects in two ways: *Search using the object name or Scan their barcode* through the computer web-cam or iPhone. Each object is linked to a short video that shows a possible way to look at it. *The scanning made the app and the web-cam things clear right from the beginning. We think the app is more interesting because it makes the project the first mobile documentary. Because the fun of it is to move around a room and choose objects, you're curious about the result it's gonna give you.*

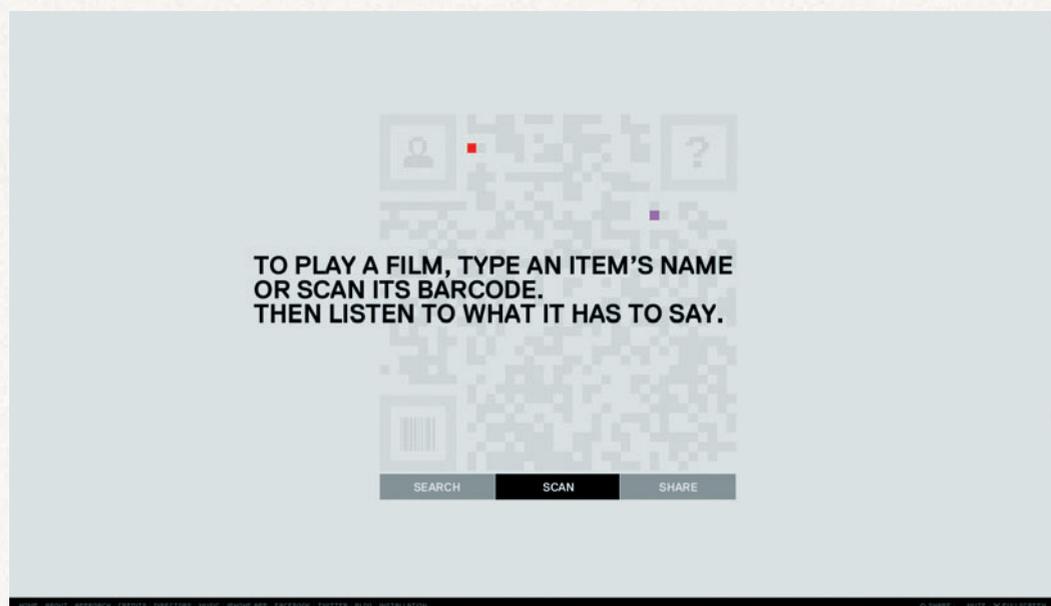
BarCode it's a collective process including a filmmaker (Pascal Br ouard), a designer (Philippe Archontakis from Departement.ca), a programmer (Nicolas Roy from Departement.ca).



Categories, interface.

■ The individual who is before us in the queue has not completely emptied his trolley as we try to arrange a thesis sufficiently effective to free us from the weight of one of the most frightening and inescapable accusations of these days. Well, it is agreed: it is probably too easy and no doubt very unrealistic to claim that the objects actually are our slaves, not the other way around. It is at least less hypocriti-

cal to argue that the things we believe are indispensable are as such because they also contain a bit of us. Each object, in addition to its own usefulness, has another function: *objects are like mirrors: they reveal who we are.* This is the concept behind *BarCode / Code-Barre*, a multiplatform collaborative project co-produced by the National Film Board of Canada and ARTE France. In an interview



Search, Scan, Share, interface.

ment.ca), a delegate producer for the films on the French side (*Quark*) and ourselves (ARTE + NFB) as producers. Then we worked with 30 video artists from every background: doc, fiction, ad, art, students. We wrote a “production bible,” the dogmas of the project. Format, form, how to approach the subject. They knew that an object had to tell us something about us - who we are, how we live with each other the world we live in. They knew the 14 categories, that are Culture, Entertainment, Drinks, Food, Sports & outdoors, Work, House & home, Personal care, Animals, Transport, Health, 18 and over, Electronics, Clothes & fashion, plus one “ghost category” which includes five videos indicating that the object has not been found. The format is fixed for each video: The films had to be 60 seconds, no more no less, starting and ending with a straight cut; important constraints but totally open at the same time. [...] Internet-time is hyper short time and the goal was not just to watch stuff - the action of looking around, choosing an object: that's part of the narrative. [...] Blaise Pascal once wrote in a correspondence to a friend: “sorry for this long letter, I didn't have enough time to write something shorter.” [...] At first, we did 10 pilots and let the creators choose their objects. In production, when we reached over 50 films, we started commissioning specific objects - unavoidable products, things we were sure would be scanned a lot and all things necessary for the stories we wished to tell.

As a matter of fact, we instinctively looked for videos related to the object that could have the more funny outcomes. This is because we – as users – not only are secret chronic consumers, but also tend very easily to morbidity. So, scanning a bottle of beer we are lead to a crazy merry-go-round as a metaphor of alcohol effects. Then we jump to an old man talking about condoms and his transgressive past, and afterwards to cigarettes as seen through the eyes of kids, or rolling papers used in a playful way by a group of teenagers, to end up with the objects that are closer to us: a computer, a mobile phone, a book, a post-it. We want people to scan stuff - look around them,

see the objects differently, says Hugues, but this is only the more immediate and easier action of users' participation. In fact, one part of the platform is open, *If things could talk*, where users can generate content by uploading pictures and sharing a brief comment describing their relation to the object and its meaning from their own point of view.

To the question why the users' uploading is restricted only to photo and does not allow video, the producer answers: *mainly because of the quality and volume we were aiming for - photos come in larger number and in surprising artistic results. Photos are also a lighter way to create right on the spot. But the more we move with other projects, the more we want to blur the line between the two. It makes people engage better in the representation of the content, to involve them right from the start, even before the projects are actually on line. [...] Participatory aspects of projects are not boxes for people to throw in stuff. Never assume participation. You have to direct UGC (user generated content) like you direct films - leading the participants through a specific road map.* Hugues comments on the users' response to the project: *more than half of a million objects were scanned through the process. One of the biggest rewards was witnessing people from very different ages, social classes, style and race playing with the installation in the subway. It's democratizing art - it's creating a rupture in the every day life, triggering the imagination when you less expect it to happen.*

The installation was not part of the project from the very beginning, but it came a bit later with Caspar Sonnen from IDFA's DocLab [...], who threw that idea of a physical experience of BarCode. So the in situ version made the project do a full circle: the surface of projection is a giant barcode - the barcode becomes the screen. We also programmed the installation in the middle of the busiest metro station in Montréal. The response was very positive not only from users, but also from the professional world: in 2012 BarCode won the Grand Prix Innovation of NUMIX in Montréal and the FIPA d'or at the Festival Inter-

national des programmes audiovisuel in Biarritz (France) for the Web creation category. What is open in this platform is not only the user generated content but also the social discourse that the project calls for, an open discourse aimed to document the human-object relationship. *I think BarCode is a documentary in the sense that it is an interpretation of reality, a point of view on the world of objects. The films are not all doc but it doesn't make the thing less of a doc experience. It's an anthropological approach to the stuff that surrounds us. People under 40 years old today don't know the world before marketing!*

BarCode suggests going beyond or through the material dimension of objects to see other meanings in a range of common experiences coming from different points of view. This could be a possible way to react to the supposed slavery to objects: objects are not just things, they also act “as mirrors.” Objects “reveal who we are” if we find a way to look at them as we look into a mirror. And a mirror is the object in which we are used to look for the reflection of our image: we try to recognize ourselves in it, as a basic act of self-awareness. Through BarCode we recognize ourselves — and our objects — in the stream of experiences of others. This is an open gesture: an act of social-awareness. ■

Sonia Campanini & Luciano Palumbo

If things could talk, interface.



SOUND & MUSIC

edited by ELENA BISERNA

SOUND & MUSIC IN THE OPEN

According to Jacques Attali, "music is prophecy. Its styles and economic organization are ahead of the rest of society because it explores, much faster than material reality can, the entire range of possibilities in a given code"⁽¹⁾. Many of the changes in the forms of knowledge production, distribution and access established by digital culture have in fact acquired early and widespread significance in the field of sound and music.

■ The redefinition of the modern notion of authorship, the practices of reappropriation, recombination and sharing, the challenge to the predetermined boundaries between (active) production and (passive) listening have been some of the cornerstones of experimental

music and sound art in the 20th Century. Moreover, the normalization of these dynamics on a large scale through the progressive cutting of production costs, digital formats, P2P networks, and free software – although continuing to arouse struggles and regulations attempts – has already shown its potential setting the stage for broader and collective sharing and collaboration processes.

The deconstruction of authorship and individual creation can be traced back to the 50s and was developed further in the following decades. From Boulez, Stockhausen and Berio's "open works", in which compositional indeterminacy gives to the performer a degree of formal responsibility, we got to more expanded forms of participation: with "4'33" (1952) John Cage shifted the focus from music production to the act of listening, including the audience and the context in the creative process and shattering the barriers between composer, performer and listener; in 1966, with *Public Supply*, Max Neuhaus overturned radio broadcast distribution model into a many-to-many platform for public interaction interpreting music as a collective cultural artifact. During the 70s and 80s creative reappropriation and recombination practices took root in hip hop, sampling and turntablism, while in the noise scene tapes exchange became a widespread practice. Since the 90s web-based musical projects investigating Internet connective, exchange or social interaction possibilities multiplied,

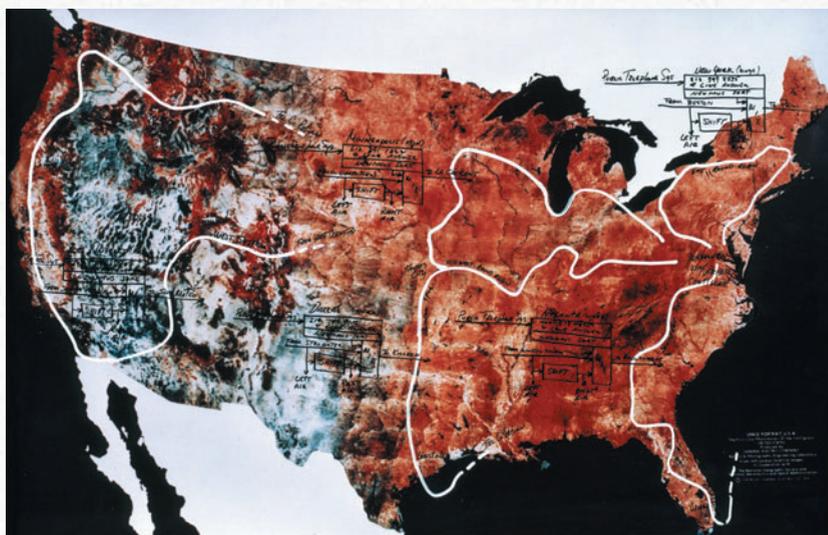
while free software such as Pure Data and SuperCollider were developed and the first file-sharing systems implemented.

Today the avant-gardes instances are no longer the preserve of a limited audience but rather the horizon toward which the entire media landscape is moving. We all are "networked listeners" creating, distributing, remixing, promoting, participating⁽²⁾. But it is precisely in this context – in which everyone can engage in shared culture and the content available seems to proliferate – and in a society where creativity and innovation have a key economic role, that the ways, the infrastructures and the restrictions to knowledge access and exchange become urgent issues. If these dynamics have reconfigured the ways, and the institutional and economic frames in which music is produced and listened, what are the outcomes? Is it the revenge of free sharing of knowledge and expertise on profit or have the new forms of distribution and social production been introjected or even exploited by the system? How are alternatives created in underground and activist circuits? Which aesthetic discourses rise from the ashes of the Author and shared creativity? The Sound & Music section seeks to address these multi-layered issues through the voice of some of the protagonists animating debates in this field.

Joanna Demers compares the current scenario with the apocalyptic predictions on the future of music industry that dominated the discussions about piracy and the extensions of copyright identifying, rather than a radical break, a persistence of monetary value and materiality. If the music system has been redefined, it hasn't been demolished. It is exactly this system from which Mattin and Julien Ottavi dissociate themselves through a radical critique of the cultural industry and more widely of the Western political-economic system. Uncompromisingly refusing individual authorship and intellectual property, and embracing a copyleft or anti-copyright attitude, they activate intersubjective creative forms, animate and promote collaborative, self-organized production or circulation systems blurring the roles of spectator, musician, producer, software developer, and organizer. ■

Elena Biserna

Max Neuhaus,
Sound Paths,
Radio Net,
Broadcast
Work,
1978.



DRAWING © THE ESTATE OF MAX NEUHAUS. COURTESY OF THE ESTATE OF MAX NEUHAUS

(1) Jacques Attali, *Noise* (Minneapolis, University of Minnesota Press, 1985), p. 11.

(2) Kazys Varnelis (ed), *Networked Publics* (Cambridge, MIT Press, 2008).

POST-APOCALYPTIC MUSIC WHAT HAVE WE LEARNED?

Girl Talk.



PHOTO © CHRISTOS (DETROY ARTIST)

In 2007, I was invited to participate in a roundtable on the future of music.

At the table were seated a well-known blogger, a law professor, a communications PhD student specializing in popular music, and a lawyer who represented a major record label. The tone of the meeting was grim. “Could there be any future for music?” was our prompt, and the consensus was no, because it was taken for granted that the impending apocalypse of the popular music industry in the West would be experienced universally, not only by other genres of recorded music, but by music in any manifestation around the world.

■ I shared in the pessimism. In those days, nearly all who identified themselves as professional music critics or scholars did. For the bizarre rise and fall of MP3.com, a company that would be sued out of existence by Vivendi Universal and the then-four other major record labels, only to have its technology bought out by Vivendi, tersely demonstrated that winning – or more precisely, winning big – was more important to industry heads than innovation, logic, or fairness⁽¹⁾.

Of the predictions that emerged in that meeting, the most resounding was that the recording industry was teetering on the brink of collapse, thanks to the rise of digital file-sharing. The RIAA (Recording Industry Association of America)’s attempts to recoup lost royalties through example-setting lawsuits – think of the many stories of teenagers from working-class families sued for several million dollars for trading pirated songs on Napster – not only failed, but also generated collateral damage in the form of increasing antipathy toward the record industry itself. Adolescents and young adults hate lawyers and big corporations, so we all said, and they have no respect for copyright law. Why would they ever want to pay for music again, if they could download it for free?

Similarly, there was widespread agreement that sampling, especially as it existed in hip-hop, was extinct in any aesthetically interesting sense, and would in the future be reserved for only the wealthiest and most lucrative major label talent. I admit that I bear considerable responsibility for this belief in particular, as I made it central to my monograph on musical appropriation and the law. The best future I could envision would consist of a two-tiered system, whereby “underground” talent would continue to sample liberally and illegally, secure that its marginal status would insulate it from copyright infringement lawsuits. Meanwhile, “mainstream” talent would, for fear of lawsuits, be compelled to license any sample, and thus would forgo sampling most of the time.

There were other oracular pronouncements at this meeting. The only positive one had a title that sounded almost poetic: *Music Like Water*. The idea here was that the income system of the music industry was woefully outdated, premised on an economy of physical musical objects like records and compact discs. The only way to save the music industry, so this reasoning went, was to transform

it into a utility like water or electricity. The blogger-participant in attendance was in the process of courting a few labels to participate in a bundled-package agreement with an Internet service provider, such that customers logging in could pay a nominal fee (perhaps a few cents per session) to the RIAA, which would grant access to its entire recording catalog. The choice or quantity of songs was of no consequence; the fee would go into a communal pot that would then be distributed among the talents. Better yet, the blogger argued, make it all a monthly subscription. No matter how much music you want to download, just pay five dollars a month, and you can have it all legally.

The advantage of this scenario was that it offered at least a modicum of salvation to the music industry, a means for its few surviving members to scrape by with some compensation. As I say, this was the brightest moment of the meeting. As for the rest, we concluded that that scrappy upstart website, YouTube, was perhaps only days away from extinction. The lawyer-participant who represented a major record label was, in fact, lead counsel in an impending lawsuit against YouTube, and coolly made it known that YouTube had no chance, thanks to the “safe harbors” provision of the Digital Millennium Copyright Act. YouTube had its chance, he growled, but it has refused to police itself and remove pirated content.

We also played with the idea that the music superstar had become a thing of the past. Britney Spears was spiraling, Madonna was between albums, Michael Jackson had not yet died, and Lady Gaga and Adele were nowhere to be seen. Finally, given that our roundtable was sponsored by a research unit with a keen interest in cellphone usage throughout the world, we touched briefly on the effects of wireless devices on music consumption, and concluded that youngsters didn’t care about audio quality anymore, and would listen to their music in the future on their mobile devices, no matter how poorly they sounded.

Returning to these predictions five years later, it’s clear that some of them have indeed proved true, but few of them have led to outcomes as dire as we might have feared. This is normal; doomsday proclamations aren’t interesting if the doomsday they proclaim is mitigated by shades of gray. Only the darkest colors and starkest contrasts make

▶ for compelling speculation. Still, it is illuminating to compare worst-case scenarios with what indeed did happen in the music industry, and as a result of music copyright, because it reveals that we might not understand our relationship to music and recordings as clearly as we might have thought.

Consider, for instance, the specter of online piracy. It is certainly true that the recording industry's revenue has dropped precipitously. In 2009, US sales and licensing totalled only \$6.3 billion, more than \$8 billion less than the same figure in 1999⁽²⁾. But it is unclear how much of this drop is due to piracy. Anecdotal evidences suggests that teens who download music illegally are more likely to purchase the very music they download for free than teens who do not download. Also uncertain is to what extent the drop in revenues has to do with the freedom that even legal digital purchases allows. One of the earliest benefits touted about MP3 files was the fact that it enabled listeners to choose the one or two songs off an album that were good, leaving behind the other songs that previously were all part of the album format. Law-abiding music listeners today may well respect copyright, but they are also choosy, and know that they are no longer obliged to spend fifteen dollars simply to have the one track they really want. There are, of course, other factors to be considered: that the 2000s began and ended with recession; that, according to many, the quality of the RIAA's output is simply not as good as it was in previous decades; that amateur musicianship, particularly amateur covers of pop hits, is especially popular now thanks to television shows like *American Idol*, *Eurovision*, and *The Voice*. On one count, though, the presages of my colleagues and me in 2007 proved undeniably wrong.

Pop stars have not disappeared. Adele and Lady Gaga together sold more than 3.6 million copies of their respective albums in 2011⁽³⁾. The court-ordered shutdown of file-sharing website LimeWire in 2011 may well certainly have funnelled revenue back to the industry, but as anyone who knows a twenty-year-old can attest, resourceful music pirates can always find new ways to download music. The statistics present us with an undeniable fact, a fact that my 2007 roundtable could not see: those who are intent on listening to music for free will find a way to do so. But many listeners continue to want to purchase music, even music they could easily hear without paying a dime, because for many, the act of paying for music signifies its value.

Sampling presents another example of history taking a detour where we might have expected a road leading to perdition. Danger Mouse's *The Grey Album* (2004) was a lightning-rod for public attention to the excesses of copy-

right litigation⁽⁴⁾. And given the Bridgeport ruling, whose famous dictum "get a license or don't sample" criminalized any unauthorized sample, regardless of duration or material, it seemed certain in 2007 that unauthorized sampling, at least of well-known popular music, was a risky endeavor indeed. But the most eloquent excoriations of copyright policing cannot account for the rise of Girl Talk (Gregg Gillis), whose music is composed entirely of samples of pop songs.

I've often used the question "Why hasn't Girl Talk been sued?" as the starting point for a classroom discussion, and I receive the same three responses: 1) artists like being sampled by Girl Talk because it confers prestige, 2) public backlash against labels pursuing a lawsuit would be too great, and 3) Girl Talk doesn't earn any money from his recordings. I believe that the third reason is probably the most accurate. Girl Talk's label, Illegal Art, allows fans to choose the amount they wish to pay for downloading his music. I've downloaded it for free, and when I enter the zero, the website responds with a reproach to the effect of "What, you don't think you should pay for music?" When I press "enter" to continue, the transaction proceeds with no further interruption.

This sass might be all that's needed to dissuade labels considering whether to litigate. Girl Talk, meanwhile, concertizes frequently, and I can only conclude that he supports himself well enough through ticket sales and merchandize. In other words, the RIAA seems to have matured somewhat in its stance toward sampling. No matter the criticisms levelled against sampling – that it is theft, that it demonstrates a lack of originality – not even the most committed opponents would charge that sampling is responsible for the precipitous drop in record industry revenue. Criminalizing sampling proved to be of no particular gain to the RIAA, which is perhaps why it chooses to overlook sampling's most brazen practitioner today.

I want to close by bringing up a third concern, one that none of us during that 2007 discussion would have been able to understand or even fathom. People listen to and love music in ways that still exceed our data and best guesses. On one hand, we have the fact that one of the most important things to the recording industry today is the power of recommendation: the sway that a single Facebook user's "liking" of a song or artist can have over real friends, online friends, and mere acquaintances. Bourdieu demonstrated decades ago the significance of cultural capital – the magic transaction in which our professed taste for particular art forms not only reflects our education and class, but confers what we believe to be prestige. Social media sell advertising on the basis of the faith that musical taste not only is shared,

but is contagious. On the other hand, we have a small but steadily increasing segment of the RIAA's revenue due to vinyl. In 2000, vinyl sales accounted for only 0.4% of total sales; in 2010, that figure rose to 1.3%. Of course, 1.3% is a drop in the bucket, but given an overall slump in purchases, this increase takes on greater importance. Vinyl is especially popular among electronica listeners who prefer its warmth to the relative coldness of digital compact discs. Vinyl culture is also an intrinsically material culture; the joys of sifting through record bins in a brick-and-mortar record store, and of holding a cherished record jacket cannot be replaced by digital downloads, even those procured at no cost.

As electronica continues to gain audiences, the RIAA might do well to consider the quiet successes of independent record labels like Kranky or Low Point that specialize in niche genres, sell a few hundred copies of a select number of new releases each year, and build small but faithful audiences in the process. It may be that the record industry may never again experience the lavish profits of a decade ago, but our habits as listeners nevertheless defy easy predictions of industry doom. ■

Joanna Demers

(1) Lawrence Lessig, *Free Culture: how big media uses technology and the law to lock down culture and control creativity* (New York, Penguin, 2004), p. 189-190.

(2) David Goldman, *Music's lost decade: sales cut in half* (CNNMoney, 3 February 2010), http://money.cnn.com/2010/02/02/news/companies/napster_music_industry/.

(3) Steve Jones, *Music industry's sales are up, up, up this year* (USA Today, 6 July 2011) www.usatoday.com/cleanprint/?unique=1332360175414.

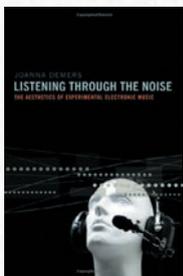
(4) In early 2004, EMI, the copyright owner of the master recordings of The Beatles' *White Album*, threatened Danger Mouse with a cease-and-desist letter for distributing copies of his *Grey Album*, a mash-up combining The Beatles with Jay-Z's *The Black Album*. Public outrage against EMI resulted in the famous Grey Tuesday protests, which in turn arguably legitimized mash-ups in the public eye.

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TO READ:



Lawrence Lessig, *Free Culture: how big media uses technology and the law to lock down culture and control creativity* (New York, Penguin, 2004)



Joanna Demers, *Listening Through the Noise: the aesthetics of experimental electronic music* (Oxford University Press, 2010)

artlab

by digitalarti
digital art & innovation



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Like fablabs or techshops, the artlab combines equipments, computers, electronics, printers, 3D printer and more within three spaces: computing, fabrication and recording studio.

› Encourage new collaborations between artists, developers, researchers, organizations...

- › Develop innovative projects including business efficiency and income generation and explore new business models.
- › Improve the digital expertise.

Pro workshops and consulting are also provided to master the tools like a physical computing workshop or a 3D workshop.

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DISSECTING THE AUTHOR MATTER

The questioning of the art system by institutional critique, Situationism's political stance, John Cage and Fluxus' conflation of art and life, punk's DIY attitude: the research of Mattin - Basque artist and musician - seems to gravitate among these vectors. While his work is centered on noise and improvisation, Mattin pushes us to explore their limits and contradictions by questioning established forms, practices, conventions and contexts.

ested in trying to detach improvisation from this notion of creativity. We would like to think of improvisation as something generic without emphasis on individuality, where impersonal expressions or generic gestures produce a radical performativity that is not reflexive, in the sense that it does not bounce back to you as an individual (or at least exposes the construction of individual roles).

The deconstruction of the contents and relationships of reception and production seems to be central in your practice.

I remember coming to one of your concerts in Berlin and finding nothing apart from background noise...

This concert was an attempt to work some of the ideas mentioned above, where structural decisions revealed some of the expectations, roles and informal power relations within the context, while also trying to generate a radical equalization of sounds (without making one more important than other) and without distinctions of what is activity and what is passivity (no neutrality in any element within the situation). I was not present there, which for an improvised concert might be a bit of a sacrilege, because I was not there to express my freedom, but I had contributed with some decisions prepared beforehand: people enter the space in complete darkness for an hour, then the light come on and a recording of the people in the room during the first hour is played back.

While the recording was playing, there was supposed to be half of the door money in the middle of the room (we were two acts that night), so the audience (or performers whatever you might want to call them) could take the money if they wanted. But Mario De Vega, one of the organizers, decided that the 20 euros from the door was too little money so he actually didn't put the money. What was interesting for me was the way the informal power relations came to the surface. I think if Mario was not an artist himself he would just have put the money as instructed, but being an artist and an organizer with some power over the situation, he expressed it in the form of an aesthetic decision that undermined mine.

A few days later I had a public discussion titled *Why I did not come to my concert*. We went through the issues that the concert brought up, some of them were not easy at all. It made me especially aware of how problematic it is to question authorship from the position of an author. The discussion totally backfired on some of the intentions behind the concert. So now I work with anonymity while also trying to use Mattin as material for experimentation and improvisation.

■ His, is a self-reflexive and metacontextual approach unsatisfied with simply deconstructing the language of music that aims at investigating the social, political and economic frame of its production and reception. It is a shift of interest from the musical form to the extra-musical sphere that is reflected at every level: the concert (conceived as a system of relationships to be forced and disrupted); the means of production and distribution (he runs three labels devoted to an anti-copyright stance, making every release freely available: the Free Software Series, dedicated to works made using free software, w.m.o/r and the netlabel Desetxea). Most importantly, the very notion of authorship (and, consequently, of intellectual property) that is brought back to its historical roots and literally dissected. Mattin's performances challenge the idea of individual creativity through impersonal forms of expression. By embracing contradictions and fragmenting expectations and prearranged roles, Mattin tries to unveil the ways in which contexts, situations and subjectivity are constructed using them as materials for improvisation and seeking to probe the experimental music system and its relations to capitalist society. Just to probe, ultimately, our society itself.

Your website states: "I take no responsibility for the pronoun "I" as a container of individual authorship". This leads us immediately to one of the most debated notions in critical theory, art and music: the author. How does this enter your creative practice?

How may noise and improvisation overturn authorship?

The notion of creativity is highly problematic because it presupposes the ability for a person to come up with something new or original. This generates a set of expectations and subsequent divisions of labor: you attach this creativity to individuals with specific roles or jobs (such as musicians or artists) inevitably producing hierarchies between different levels of activity – where the audience activity will be of a lower degree (or instrumentalized by some form of appropriation by the artist). Freedom in improvisation relates to this understanding of creativity: improvisers are free to use their instruments in ways that are supposed to be unique or original. This seems to me a very limited understanding of freedom, albeit an individualistic one, where one finds its limits in your and other players' egos, making a separation which very much resembles a liberal subjectivity: let me be "free" as long as I can express my "freedom". If we look closely at the unsaid rules of improvisation, we can see how people allow other players to do whatever they want as long as they don't interrupt their "creative" process. Improvisers are actually not that open if one tries to generate a different type of interaction that would be more inter-subjective.

The informality and supposed freedom in improvisation can lead to a lot of mysticism and obscurity, an opaqueness resembling the conceptual abstraction that we find in the notion of the author or even the commodity form. With a group of people, we are inter-



TO READ:

Anthony Iles, Mattin (eds), *Noise & Capitalism* (Donostia-S. Sebastián, Arteleku Audiolab, 2009). www.arteleku.net/audiolab/noise_capitalism.pdf

In a cultural scenario where collective interaction is often becoming the rule of production and consumption, the attempt of the avant-garde to emancipate spectators through participation seems to be absorbed by the system. Your work often questions the distinction between performer and public and, in a recent text, you introduced the notion of "managerial authorship" to underline how participatory practices, while trying to overcome the distinction between active production and passive consumption, may instead become a prosthesis of capitalistic trends⁽¹⁾.

It has to do with instrumentalisation and agency: to what extent is the artist allowing an overthrowing of the conceptual parameters that underlie the situation? To what extent would the artist allow the situation to collapse if the participation goes far enough?

When I wrote that text I thought that I might sound a bit moralistic, as if there was a clear or pure way of relating to other people. This is not my intention, there is always a level of manipulation going on and the question is what you do with it. Do you try to naturalize a notion of authorship or to dismantle it by exposing its fallacy?

So the concerts that I do (as an always questionable "I") are situations which propose that: a) the audience is not neutral b) the concert is a power relation with unequal interests and positions within the situation c) nevertheless, the positions are not stable and they can be changed or severely questioned, not as a form of liberation, but as something else.

Basically, it is not interesting to give the appearance of a liberated or emancipated spectator by some form of participation, but to produce situations in which we find ourselves estranged from our roles and don't have the tools to deal with it. We feel exposed and vulnerable.

This has to do more with alienation and the question is how alienation is produced both in a general sense and in a specific given situation. We can't liberate ourselves through a single concert, but we can explore the way we are imprisoned by a set of expectations and constructed conditions which always have a specific interest. A prerequisite to change things might be to try to understand their own construction and effects.

What about your involvement in the Anti-Copyright movement?

I would not call it a movement. Perhaps something like an attitude against the notion of intellectual property. If through improvisation you are constantly questioning the parameters of what you are dealing with, then it's only normal that you challenge making property out of an activity.

In a recent conversation with Rasmus Fleischer we discussed the connections between the obscurity of certain concepts such as music and authorship. They developed simultaneously with the notion of experience and aes-

thetics and with the emergence of the commodity form (i.e. 18th Century). We usually think of these concepts as natural as if they have always been there, but they come from certain specific developments in relation to modes of production, philosophical discussions, the way the notion of the individual is conceived and its relationship to the law.

The legal system that reinforces property is based on a bourgeois subjectivity that understands freedom as the separation of individuals from their community and of individuals from each other. Historically, Marx sees this as a development of the declaration of Human Rights, which enshrines these separations. The law, rather than preserving our freedom, is an ideological result of egoism and atomism, thus reproducing the understanding of freedom that is needed for the development of capitalism. Since the capitalist mode of production relies on the wage-laborers, who are free to sell their own labor power, workers might not possess any means of production but they can have their own bodies and supposedly political and legal equality. Rather than being the subject of rights, individuals become their objects, and they are, furthermore, degraded and segregated as these objects.

Likewise, commodities are objects that are equal in the eyes of the market. This shows how human and property rights are all connected by the ideology of bourgeois subjectivity, guaranteed by the security of the police force. Stability was also needed in order to develop a specific understanding of time: the homogeneous abstract labor time that can be measured through its productivity and therefore be given a value. It was under these ongoing conditions that the notion of the author could get some relevance, but today we are able to identify the fallacy of the concept. For example, though technological and digital means that disregard individuality as the source of production and distribution, such as free software.

Coming to the Free Software Series: why have you decided to found a label focused on free software?

The label had to do with the emergence of different people working in experimental music using free software. Most of the people working with free software are very aware of questioning notions of intellectual property, but they have different positions with regard to it. So one of the prerequisites for a release on the label is to state that position (anti-copyright, copyleft, GNU license or any other form of explanation). The intention is to bring forward a discussion about it. On the other hand, there are people like Taku Unami who are curious and might have one computer with Mac or Windows operating system and another with GNU/Linux to try things out. So when they get invited to do a release on the label, they need to use the computer with GNU/Linux. The means of production in experimental music have ideological repercussions, which I think should be discussed further.



PHOTO © HRVOJE GOLUZA

You elaborated on some of these issues in writing, in particular in the book "Noise & Capitalism"⁽²⁾. Would you redefine anything after 3 years? What is the critical potential in music making today?

The book was started in August 2006. The crisis has happened since then. A lot of different struggles have taken place. The book was a way of realizing that there is nothing inherently critical in abstract sounds. The criticality arises from consciousness of the way they are produced and perceived. It is now clear that noise and improvisation these days do not have much to offer politically. However, some of the conceptual proposals in their intentions still invite further investigation, which can relate to contemporary political discussions. For example, in terms of improvisation we could see some similitude to the notion of communism; producing communism in action while simultaneously abolishing property, wage relations, gender relations, the private and public spheres, and the labor theory of value, without the need of a program, prescriptions or any other form of mediations. However, in order to do this we would need to investigate further those material and ideological conditions that seem peripheral to improvisation and experimental music production but in fact provide its *raison d'être*. ■

Anti-Copyright
Interview by **Elena Biserna**

(1) Mattin, *Managerial Authorship: appropriating living labour* (Casco Issues 12, Sept. 2011).

(2) Anthony Iles, Mattin (eds), *Noise & Capitalism* (Donostia-S. Sebastián, Arteleku Audiolab, 2009). www.arteleku.net/audiolab/noise_capitalism.pdf

Mattin
@ Sonic Protest
Festival
(with Billy Bao),
Paris,
05/2007.

JULIEN OTTAVI / APO33

DECONSTRUCTION IN NOISE

Julien Ottavi is a very interesting contemporary hybrid intellectual able to wander and to combine media-activism, sound composition, poetry, experimental film and anarchitecture. He is founder and member of Apo33 collective - a productive association of the interdisciplinary fields of art and technology combining research, experimentation and social intervention - which includes the fusion of sound art, live-video, new technologies and body performances as their DNA, developing hardware and software tools for creative projects.



■ Since 1997, Ottavi develops a compositional work that uses voice deconstruction and fragmentation processes through digital editing. As a developer of audio/video with Pure Data, he rummaged up the banks of electronics for many years, building with unconventional or obsolete elements, and maintaining a "militant" view to share knowledge on technological development, a route that led to the creation of APODIO, a Gnu/Linux operating system for digital art. He follows unconditionally the open source philosophy, interpreted as a complete opening liberated from intellectual property fences, from classical ideas of author as individual creator, and from artwork as product of unique and individual talent. Starting from the underground scene of Nantes to a global dimension, his work is characterized by a fluid approach that stands out as a constant leapfrogging of categories of style and function.

How did the idea of Apo33 start? A collective linked to a militant artistic context guiding its work in new media today is no longer unusual, but perhaps when you started it was.

Apo33 started in 1996. The original idea was to bring experimental and noise music, performance, all those genres that were not covered by mass media, to Nantes. We evolved around 2000 toward the production, research and promotion of our own artworks. When we started to cross art, technologies, philosophy, theory, ecology, it was totally fresh in terms of interdisciplinary organizations. We were collaborating quite a lot with militant organizations, mixed alternative media and alter-politics, art collectives, organizations working with free software, new technologies, copyleft and, finally, others groups engaged with theory and philosophy. However, not so many of those organizations were cross-mixing all together in a non-hierarchical way. Today those practices are more widespread and we can find more organizations like Apo33 around the globe. We are glad because it's important that those modes of organization multiply like viruses and plant some new seeds in people's everyday life.

I find especially interesting the linking of technological and socio-economic changes of the "information / communication / economy" to concepts of production and consumption that exclude the direct involvement of money. I am thinking of those so-called "economic non-monetary activities" that are hard to be measured by monetary indicators but that can perhaps be better explained by the categories of digital media, networks, and flow aesthetics⁽¹⁾.

Well, this wasn't the first link, but it has become important at some point, because we wanted to survive with our art without having to sell our souls for it. We wanted and still want to be able to be as coherent to our desires as possible. You produce art, software, knowledge, tools that you share with your community, you are not selling goods to make a profit. If you sell something it will be related to services, processes of production etc. The copyleft movement brings new paradigms of economical exchange based on social relations and change in "principle," as opposed to capitalism, whose objectives are the exploitation of workers and profit from any possible good, even from money itself (as virtual object), mass-productions and exhaustion of nature (land, resources, animals etc.) and human activities (art, agriculture, energies, science, housing etc).

For a few years, free software has been engaged in network practice. Through these initial networks, source code has been able to circulate; it has been shared, copied, modified. Free software could only be developed out of collaborative work, multi-authored projects, programming, corrections, beta-tests. From the outset, the "free" project participated in the Internet project and the practice of networking. Without free software and the options of out-of-copyright licences, the notion of digital networks would have found itself limited to paying sites or to sites controlled by companies. Whilst these companies are visibly present in the current system, they have to compete with more open structures added to a variety of products stemming from the free movement, such as software, texts, ideas, documentation, distribution, community, mutual aid, forums, modes of sharing etc. Many forms of creation associated with contemporary notions of networks, sharing and collaboration have been developed in and outside of the Internet...

When the author is multiplied tenfold, thousandfold, when the machine (prosthesis of the human) becomes an autonomous and almost unbound creator, we could see a new society being born where new visions mingle and get entangled, pile up and explode, new hopes arise leading to transformations. Machinic transformations lead to chaos, the unknown, and unexpected behaviors. We are now running in darkness with fear as our only light, maybe toward our extermination, like Icarus aiming for the sun, trying to disappear into the sun. But what has this to do with artistic practices? Maybe these practices only mirror our scopes, desires, ghosts? Maybe desire is necessary to our transformation, and we need to create with machines, through networks; to participate collectively in an incommensurable and endless work of art, with networks acting as multipliers into a myriad of permutations.

What do you think of the current glitch music scene? Often this type of expression is based on an aesthetics of error with a post-structural matrix, and finds its conceptual orientation in Deleuze and Guattari's slogan: "desiring machines only work when they break down"⁽²⁾. Is it also a way to express your political view?

It's interesting to look at the issue of the error in art in general from improv music to experimental cinema. The glitch, the digital error, the bug, the dirtiness are very important for new modes of expression to emerge: they open up new ways

of playing with the medium or provide tools for the artist. In the case of the computer, everyone is confronted with its limit. It is a technology far from being perfect and, at the moment, it just multiplies with no end, resulting in junkyards in India, Africa or China, with poor people and children being intoxicated from recycling the dangerous components that make these tools. Not only should we think beyond just making music or digitalized art, but we should also take into account the recycling aspect of it. GNU/Linux and the new practices of recycling machines for new uses should be able to inspire artists in their music, in their art production.

The training of those involved in these disciplines is necessarily heterogeneous: it is often located at the crossroad between artistic and musical education, or from a completely different area. From which area does your world draw inspiration?

Over many years I developed an artistic research practice based on new forms of musical writing using computers, audio and networks. Drawing from the musical interpretation of Graphical scores such as Cornelius Cardew's *Treatise*, Earle Brown's *December* and John Cage's *Cartridge music*, I have focused my work on the idea of programmatic composition, researching in the field of coding as a score or a merger of score, instrument and direction. Therefore, when I write a piece of code or a "patch" (I use PureData as my main coding platform) with an emphasis on specific ideas like "frequencies studies" or "white noise music", the program moves the interpretation toward an advanced area whereof the musician follows undetermined paths: the Graphical score in which his interpretation is strongly related to the composition's openness.

The computer became, for me, a musical realm where musicians, interpreters, composers, programmers and so on merge with new tools in which unimagined musical possibilities occurs. More than an instrument, the computer provides a whole new understanding of musical composition. I can build my instrument and write a composition together, as I interpret and play the music to an audience, and simultaneously record and distribute the results across the globe. I can control the entire chain of artistic production, from its writing/conception to its production/distribution.

Laptops and other mobile technologies, such as digital recorders, bring another level to these musical practices. We are no longer restrained by our spatial positioning: the studio space, as the musician/composer's cavern/refuge can become as nomadic as it is necessary for its user to be. We can almost write/compose/play/distribute music wherever and whenever we want. Those realities have changed my musical practice, creating greater freedom of movement to time-space restrictions or geographical limitations within the framework of my musical production. At the same time, as greater mobility through the computer has utterly changed my relation to the studio, the World Wide Web arrived and with it another dimension of my musical practice. I am now able to play remotely with other musicians/composers in concert venues,



PHOTO: JULIEN OTTAVIANO33 (COPYLEFT)

without having to physically be in those places. This has led to producing and participating into online musical festivals or remote concerts, as well as to collaborating with different musicians where the audience, like the musicians, are no longer in a dedicated space, but are everywhere, globally scattered and experiencing these productions simultaneously. Using streaming technologies we can transfer very high quality sound over the Internet.

Ultimately, this means that in order to explore these new practices and musical collaborations, I am now able to play with the musicians with whom I wanted to play without having to plan a journey, flights, visas etc. This also served to reinforce the community and opened the borders for musicians in countries like South America, Africa, Asia, whose work was not distributed or known in the West. I also started to set up my own servers to experiment with online musical studios, where I recorded an entire album collaboratively with another musician in New York, without ever being in the same country during the production of this work. Using the traditional function of the studio (post-production), recording audio, multi-channel mixing etc. with this online platform, we worked for one month on few hours of recent recordings and completed new compositions for a 45 minutes CD.

My work is preoccupied with one dream: being able to listen to the music I have in my head, paradoxically without making it. This stems from the idea that first and foremost I am a listener. The musician/composer is born out of it. When I play/create music, I like to be able to listen to it at the same time as the audience receives it, rather than focusing on the compositional process. Recording was not enough, since its organic evolution is stifled. I wanted to hear music with uncontrollable/unpredictable components, with external sound sources (external from the computer synthesis, algorithm or logic). Thus, I decided to create an

automated composer, taking a lead from the point where Music is, as John Cage proposed, that is: a series of events within a time line, Music is the writing of time, Music is time... This automaton system should be able to mix sound through a system of samplers, volume controls and effects managed by different clocks performing processes through randomized values, including unknown reactions from live data controls such as input fundamentals, frequency and envelopes. This music can be created from anywhere, by capturing sound in the street, in a field, in a building, mixing it, transforming it, sending it via the Internet, and streaming it in real-time to any listener in cyberspace.

To date, I have been able to listen to my "own" music from home without making it and I am able to listen to the subtle transformations of sound and unexpected movements originating from the changes within the sound source connected to the activities happening in those streets/buildings/fields of audio capture: [...] a community creates specific potential uses of technology The 'user' of technology therefore, is not an individual person but a member of a community with a practice that uses the technology in question. The individual user is engaged in the practices of the community and makes sense of technology in the context of these practices. When innovation changes these practices, new ways of doing things create new interpretations of the world. If innovation is technological, technology becomes integrated in social practice in new ways, and acquires new meaning⁽³⁾. ■

Interview by Pasquale Napolitano

(1) Manuel Castells, *Internet Galaxy* (Oxford, Oxford University Press, 2001).

(2) Gilles Deleuze & Félix Guattari, *Anti-Oedipus* (Minneapolis, Minnesota University Press, 2000).

(3) Ilka Tuomi, *Networks of Innovation, change and meaning in the age of the Internet* (Oxford, Oxford University Press, 2002).

JuLien Ottavi
The Noiser

DREAMS AND DRIFTS IN THE DIGITAL ARCHITECTURE.

We cannot talk about Modernity anymore, but we can observe a new operating spirit floating around us, leaking from almost any human activity, driving our evolution toward what I would call "Advancity".

■ Technological developments run side-by-side with the increase of those global problems highly resistant to resolution. Because of their non-linear nature, the so-called "wicked problems" are by definition so complex that they are considered likely unsolvable. Somehow taking advantage from their parallel presence, technological progress and global wicked problems force human beings to keep thinking and strategizing. Acting upon complex problems means that we are compelled to connect objects with the whole, while technology enables us to operate practically on these complex systems. In turn, the current production and informational systems create emergent phenomena as complex scenarios arising out of simple interactions.

The Computational Design of products and processes using digital instruments and the Open Design - the development of concrete products, machines and systems by means of publicly shared design information - are becoming disruptive approaches that re-materialize complexity in the physical world. Digital manufacturing, associative planning and the rise of co-creations are significant outputs reflecting the efforts made by architects, designers and engineers in these fields.

This emerging scenario raises some key questions. Will the paradigmatic shift in professional identity drive human intervention out of the automated process, as a result of the overwhelmingly growing "digital chain" in design? Will mankind manage to keep a key role in future scenarios? And if yes, which ones? In a cultural and technical environment, where forms and techniques change

too fast and too often, have forms and languages still any meaning? Within this section, I ventured to provide answers to these questions by asking them to 3 influential architects operating within the international design scene. Using the theoretical essay and interviews, these dialogues suggested the following: as often happens, paradigmatic shifts in technology and material production led on human labor to create a multidirectional chain reaction that locally influences behaviors and processes.

In the field of construction, Norbert Palz explains that digital fabrication technologies allow to re-conceive construction material by customizing its performance to better fit the geometrical qualities of the designed element. Therefore, the discipline of architecture needs to reconfigure itself. Still far from being fully understood, new architectural opportunities are coming up. Traditional roles and standard building elements are questioned by the technological turn and they are going to unavoidably change or disappear. In other words, a true architectural revolution is in action and "inclusivity" will be its buzzword.

What is the difference between a computational designer and a traditional designer? Marc Fornes honestly reveals that there are no actual practical differences between the two figures. Computation is a pure language, just another means of expression that exploits a scripting code to create a direct dialogue with a computer to generate a voluptuous shape. It is not the machine that makes the design — he says — but the acumen and the

determination of the designer himself, who instructs the script to generate a solvable and feasible set of design elements. Fornes demystifies his magnificent and puzzling *What is it?* — *architecture* hinting at what, in my opinion, is the difference between advanced and non-advanced designers.

Marc Fornes points out that computation and digital manufacturing technologies mainly progress thanks to the designers' strongly explorative approach. The evolution of design we are witnessing requires a totally bottom-up approach to effectively advance. Actually, this is the interesting aspect. If it is true that any type of designer needs to gradually evaluate design issues in order to simplify and break down in simple bits the phases leading to the project, the advanced designer's work will differ from the traditional designer in the final output. What an advance designer researches is not a final solution, but only the way to progress a continuous and very gradual evolution.

Advanced design aims to constantly bring into question the human pre-conception of space by concretely testing new spatial scenarios. The traditional, heavy and standardized construction elements are challenged by lighter structures featuring customized-resistance and multi-material embedded elements. Last but not least, consciously or unconsciously, advanced design destabilizes professional status quo of the architect.

Indeed, traditional architectural authorship is going to likely disappear as a result of two main facts: long digital chains within design process makes the responsibility and the ownership of a project difficult to be detected; open source design redistributes labor among a huge number of contributors. Unlike traditional media like the old-fashioned newspaper that we no longer need in digital era, Daniel Dendra believes that new generations of architects are not on their way

Additive fabrication of a knitted geometry.



PHOTOS © NORBERT PALZ

View of the restaurant inside at the Austrian Pavilion at Expo Shanghai 2010. Project by Matias Del Campo, Sandra Manninger (SPAN Architects) and Arkan Zeytinoglu.



PHOTO © MARIA ZIEGELBOCK, 2010 / COURTESY: SPAN ARCHITECTS

to become obsolete. Rather they are going to meet a new renaissance that will redefine their roles. The rise of collaboration can be considered a move towards liberation from the unsustainable and venomous system of competition, which in the last decades has pulled the strings of the architectural mass market. A revolution is coming from this point of view too.

Most of these valuable topics are not totally new in the field of architectural research. However, for the first time, we can concretely evaluate their results and benefits - i.e. We can do it. Digital manufacturing allows testing in person the repercussions of highly complex spaces on our perception; parametric software – a package able to manage a set of related mathematical equations incorporating variable parameters into a geometric output - proves the money and energy saving of advanced buildings; social web applications allow concerted forms of work organization to effectively happen. It appears that several of the well-known problematic aspects concerning design and their related aftermaths (by now passively accepted as “unchangeable inherited facts” - related to the solid memory of a society, i.e. the architecture) are now considered intolerable and rather actively solvable.

Even if this introduction aims to highlight the positive effects of these advanced phenomena on our environment and, by observing communities' practices as regards Digi-

tal Design into the networks, there's no lack of encouraging examples of an ecological awareness, it often seems that the general attention is dangerously more focused on performance. The concept of responsibility, which is implicit in some approaches to the engineer profession, seems often to be translated into “quality”, that is to say a deontological commitment to customers, to whom it's essential to deliver products realized in the best and optimized way possible. Within this view the cultural, social and holistic dimensions of responsibility can easily be missing.

Based on these considerations, the opportunities and the new awareness emerging from the rise of the digital design can be finally summed up. If through a vertical and sometimes myopic perspective, modernism in architecture has been often responsible of the construction of insensible urban environments, computational design aims to create hyper-customized spaces that require a bottom-up approach for the user to experience and use them.

Collaborative design can bring unprecedented building processes that encourage transparency within the business of architecture, implementing the business itself in a more distributed and sustainable way. Shifts in material production foster design thinking, which in turn triggers reactions and revolutions in the organizational level of human activity. In a way the entire world has always

evolved thanks to these transformations but what is really interesting at our time is that “going digital” imply the will to introduce living variables, as desire and multiplicity, into the design process.

We are starting to think that it could be possible to give birth to something that is still undefined, a blend of digital and analogue that plays with social sentiments and human emotions. In contrast to a mere performance-driven approach, which shows no real step forward over the modernist approach, the pure digital romanticism, the “desire-driven” design we are currently witnessing makes the idea of evolution something very attractive for mankind. May I live in interesting times. ■

Sabina Barucci

Internal view of the current state of Narkomfin building (Moscow), designed by Moisei Ginzburg with Ignaty Milinis in 1928, a fine example of Russian Constructivist architecture, now nearly abandoned.



PHOTO R.R. / COURTESY: OGINKOVAUS

To express is to drive. And when you want to give something presence, you have to consult nature.

And there is where Design comes in. And if you think of Brick, for instance, and you say to Brick, "What do you want Brick?"

And Brick says to you "I Like an Arch."

And if you say to Brick "Look, arches are expensive, and I can use a concrete lentil over you. What do you think of that?" "Brick?" Brick says: "... I Like an Arch".

(Kahn and Twombly in "Louis Kahn: Essential Texts", 2003)

TUNEABLE MATERIALITY

Contemporary architectural production employs an increasing number of computational tools that undergo continuous proliferation of functions and changing allocations within the design process. In the early years of the 1990^{ies} the available drawing programs were no more than a digital translation of analog processes and were restricted in their accessibility, available modeling features, and calculation power.

■ Computational tools in architecture today have proliferated in their scope of usability and functionalities, complemented by numerically controlled fabrication processes, thus extending their impact into the domain of direct manufacturing. The initial separation between the designer and the fabricator persistent through centuries in architecture has been altered through an engagement of the digitally skilled architect with access to fabrication technology. Computer aided manufacturing can now be digitally controlled by architects and allow deeper implementation of their design concepts in

the construction, appearance and layout of architectural structures, surfaces and spaces. So can planar building materials such as steel plates or wooden boards that are economic to cut by a 2D laser or waterjet become spatial elements bent into place and individually assembled to create a continuous and curvilinear spatial experience that was unimaginable without the introduction of computer guided manufacturing processes: the complexity of the individual spatial pattern would have been too high to master. Similar to the *drapage* techniques known from fashion design — in which a planar

textile is folded into a complex three-dimensional shape — operate these new designs thanks to an interaction between material, geometry and technology to create a spatially complex appearance. These fabrication technologies that complement the digital design process can be hereby differentiated into *subtractive* processes, e.g., 3-5 axis Milling, Laser or WaterJet cutting, where material is removed by a tooling device from a given volume and *additive* processes, producing a part through the controlled, layered assembly of material.

Subtractive methods that cut or grind away layers of material can be interpreted as an enhancement of a traditional toolset of material handling. Milling technologies can be seen as automated carving processes; computer-guided cutting thus replaces the former process of laboriously separating material with knives or bladed instruments. Through technology, the historical characteristics achieved by the manual reduction of material have been extended, amplified and refined by means of higher mechanical precision, larger scales, faster production cycles and a broader choice of materials, where the human is engaged as a control and design instance. The implementation of this technology in architecture expands further to the ornamental design of three-dimensional surfaces where the traces of the milling path are artistically controlled and add a refined three-dimensional articulation of the surface material. In this way the machine is not only used to materialise a designed object as precise as possible, but as a new instrument of architectural formgiving that integrates its mode of production for the aesthetic presence of the so created object. Conversely, *additive* fabrication is a collective term for a series of innovative manufacturing processes that allow the vertically layered materialisation of three-dimension-

al digital content in a broad variety of materials ranging from polymers, plaster, biodegradable materials to metallic alloys and others. The geometric complexity of the digital volume model to be fabricated in such a process can be high and allows very detailed objects to be printed in a similar amount of time as simpler geometries, since the volume is constructed out of vertically arrayed cross-sectional layers of materials in a chronological sequence. The factors that determine the scale of achievable detail are defined solely by the additive manufacturing process, which transmits the sectional information of the initial geometry to the respective print head or laser beam that melts, sinters or glues the material to a stable form. This independence of geometry and manufacturing time represents one of the key innovative properties of the technology.

The development curve of the technology is steep. The first industrial process introduced by 3D Systems in the late 1980s was restricted to small scale and high layer thicknesses, yet today can we see enhancements in available print materials and the overall production scale. In 2008 Objet Geometries introduced the Connex Technology that allows the additive fabrication of up to fourteen polymer materials simultaneously in a single building process. These materials can vary in their elastic properties or translucency and can be assembled for the production of realistic models with the right touch-and-feel haptic. Around the same period Enrico Dini developed the D-shape process that utilises a binder and a natural stone granulate to additively fabricate building scale components to up to a dimension of 6.00 x 6.00 x 6.00m. Given the fact that additive fabrication makes the materialisation of geometric complexity effortless, the focus has shifted increasingly in the direction of refined computational geometric procedures as the locus of the designer's activity to define the subject of such materialisation procedures.

The level of abstraction introduced by these modelling processes provides great openness for the implementation of formgiving drivers from a variety of sources that are interwoven in a collective code and geometric morphology beyond an obvious designer's preconception. The structure of these software applications introduced a different relationship between the Designer and the Designed by altering the locations at which the formgiving process would be initiated. The traditional design practice followed the protocol of descriptive geometry and saw the architect working himself through a series of codified drawings as elevations, floorplans and sections to end up with his final design. Design changes had to be implemented in distinct drawings individually and made the graphical representation process during the

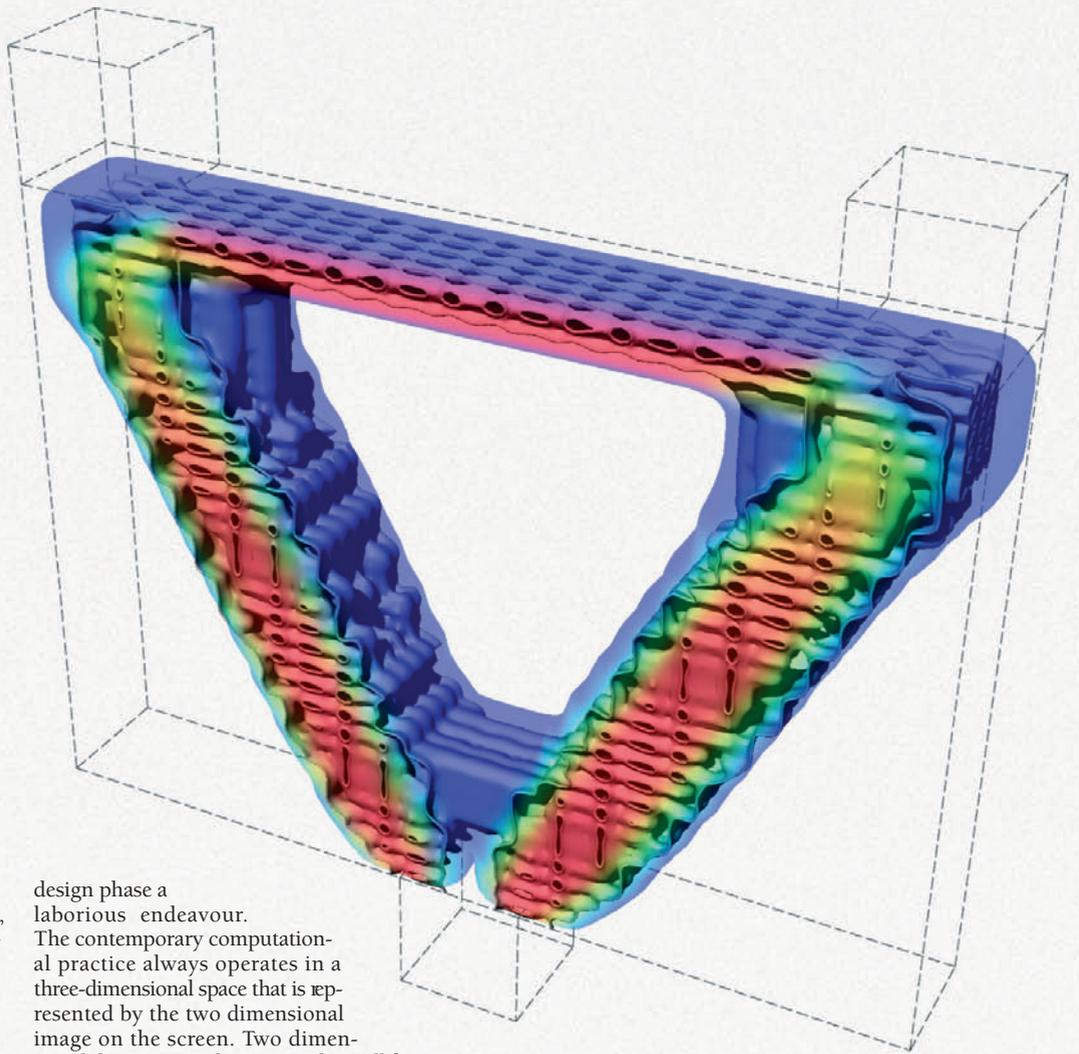
design phase a laborious endeavour.

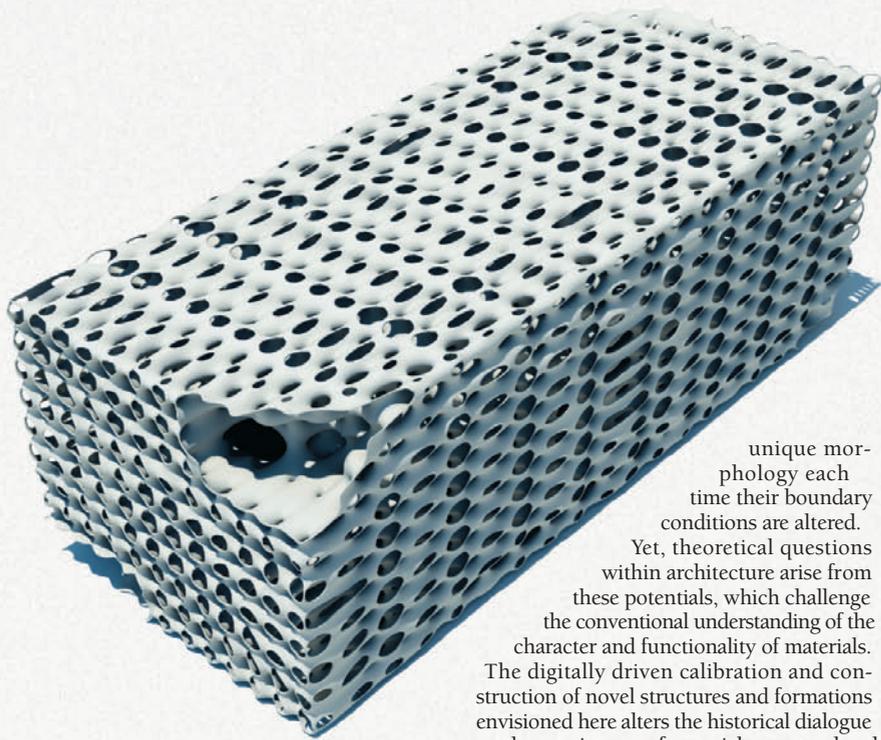
The contemporary computational practice always operates in a three-dimensional space that is represented by the two dimensional image on the screen. Two dimensional drawings can be extracted at will from the digital model. The geometric elements of the design are furthermore parametrically interconnected, changes of one element reflect back to the appearance of the other. If we imagine a three dimensional grid that is built up from cubes or spheres a classical geometrical drawing program would require a redrawing of the entire grid cluster whenever a general change of one of the elements would occur. In a contemporary parametric model the individual parameters that define this grid and its dependant elements are numerically related and can be altered at will and in consequence update their three dimensional appearance as a reaction to a change of the initial dimension. Competing issues, like programs, environmental and economic performance, as well as less obvious entities like the individual design strategy compose the process of digital formgiving and must be merged into a coherent system of geometric relations.

The geometry machine constructed by these interwoven relationships channels, dynamically interprets and changes these organic fields of information that substantially drive the design intention. These parameters can receive formgiving information from many sources like coded logical statements or numerical values that are harvested from mathematical dependencies or even numerical translations of images that are employed for that purpose. This openness to many formgiving entities gives great latitude for artistic and architectural design since translations,

interconnections and re-applications of the employed formgiving factors are facilitated. A simple rule that defines the degree of a façade opening in dependency to the solar gain and building function can so sufficiently describe a gradual distribution of locally different shading devices of the individual openings. Changes on this design are not executed on the individual building element but are achieved by an alteration of the initial rule that starts a novel design iteration. This process, representing a major departure from the Euclidian geometric protocol in which each element of a design was drawn individually, blends different formgiving domains of data into an interconnected tissue of computational, mathematical and artistic origin. The emerging complexity that can be observed in such designs expands fully pre-conceivable, pragmatic and rational materialisations of earlier eras and fosters geometric and numerical overlaps that come with their own formal language and a new aesthetics of local irregularity. This fine control over digital geometric contents of high detail and irregularity can be now investigated for the local calibration of building materials and components through computational control of its internal structure and composition that can be designed, analysed and later additively fabricated in a single digital chain. But what would be the consequences of such a digital materiality for the architectural design process? >

Parametrically controllable cellular solid based on optimised topology and principal stress, Daniel Bünning / Chair for Digital and Experimental Design Prof. Palz - University of the Arts, Berlin





Computational design of parametrically controllable cellular solid structures with graded porosity, Daniel Buening / Chair For Digital and Experimental Design Prof. Palz - University of the Arts, Berlin

Architectural and engineering progress in history was often related to innovations in building technology and the discovery of new materials. But its implementation was not always a success from the start. The first civil engineering structures created after the invention of cast iron in the 18th century still applied structural principles of masonry and timber constructions rather than taking full advantage of the structural properties the new material made possible for the formal repertoire of architecture. In the classic example of the Coalbrookdale Bridge (1777-79) one can verify this misguided application in the fact that the joints of the iron members were designed as wooden connections, and thus contained structurally ineffective components. It was only in the later years that iron and steel revolutionized the architectural repertoire through their lightweight and efficient framework as one can see in the famous Crystal Palace by Joseph Paxton (1851); later, reinforced concrete allowed large spanned structures to be erected with simultaneous stress and strain load-bearing capabilities as we can see in the seminal buildings by Pier Luigi Nervi, Eero Saarinen and others.

Additive fabrication, by contrast, allows a new design process to emerge, one that considers material not as a homogenous property whose traditional application is based on centuries' long practice and efficient economic repetition, but rather as a unique and variant structural constellation of matter in space that can be digitally designed and materialised in various scales. These materials contain structural properties that are *in flux* and different in three dimensions. The prospect of additively creating materials with such bespoke internal composition and material selection bears the promise of making a useful contribution to contemporary fabrication methods in terms of structural efficiency, reduced material consumption and innovative functionalities and aesthetics of accordingly created elements. Material, form and geometry are now intrinsically interwoven and can unfold a

unique morphology each time their boundary conditions are altered. Yet, theoretical questions within architecture arise from these potentials, which challenge the conventional understanding of the character and functionality of materials. The digitally driven calibration and construction of novel structures and formations envisioned here alters the historical dialogue on the consistency of material, structural and form present in architecture since Aristotle, Louis Kahn and others. Architectural designs in the future may therefore no longer be based on the best fitting structural solution for a given material with more or less known properties, but by a reverse process that tailors an appropriate material with graded, unique characteristics to a chosen form and performance. Performative complexity is then achieved not by complex mechanical assemblies, but through locally differentiated materials. The constructive order that can be traced in the buildings of Modernism separated building elements by their hierarchical load-bearing functions and demonstrated rationality and dimensions that often overwhelmed the human scale. This sequential build process that added layer upon layer of material was - and is - responsible for most of historical and contemporary architecture's appearance. The idea of a building skin can in the future be transposed nearly literally by combining different layers of individual functionalities to an integrated building component that is then additively fabricated. The potential implementation of multiple building functions into

such a single building component can hereby potentially avail itself of scientific knowledge from biology and botany. Cellular bone structures that change their cellular morphologies depending on the expected load-cases is an example that can be well described in a computational process. A suited cellular building block consisting of addressable geometric elements through numerical data could be brought in conjunction with computational analysis of expected stress or strain forces and deliver a performance-driven locally defined morphology in fair accuracy. The modulation of morphologically differentiated members for a shared structural, logistic or aesthetic goal introduce a scale shift and assign value to locality and individual difference, promoting a perception of such building tectonics in a less hierarchical and straightforward manner.

Such integrated modular building units that have to be assembled in a novel fashion will inevitably have an impact on the presence of architecture and hereby establish a new language of building construction and functional order that is based on a new sequence of structural assembly. Such complex structures can, on the one hand, be transferred to more classic building elements like walls, roofs and columns, but on the other, can also initiate a new and unprecedented typology of architectural components and in which the role of the joint that combines these elements gains a new importance and presence. These elements avail themselves of the properties of additive fabrication in distinct manners, and can provide unprecedented morphological results that introduce a new variation and human scale into building components. Through integration of the characteristic benefits of additive fabrication, an emerging autonomous, novel tectonic language can evolve that can change our traditional practice of architecture in a radical manner. ■

Prof. Norbert Palz

Norbert Palz is one of the most prominent international researchers in the field of the experimental design related to digital manufacturing. He started his architectural career in 1999, working in several computer driven architectural practices, at the Dutch firms UN Studio and NOX. In 2003 together with Robert Banovic he founded his own firm, Targadesign, a service company focused on providing computer aided guidance for artists, developing complex geometries, visualization and digital fabrication for artworks.

The company started with the production of visualizations and soon expanded into a broader field of activities on the verge between art and architecture. Between 2003 and 2007, Norbert Palz and Targadesign supplied services for the foremost artists and architects of the international scene, including Olafur Eliasson (Serpentine Pavilion 2006, BMW Art-

Car 2004-2005), Thomas Demand (Grotto 2005-2006, Nagelhaus Zurich 2010), Monica Bonvicini, Simon Starling, OMA (Serpentine Pavillion 2007) and many more.

Since 2003, Norbert Palz teaches Design Methods in several German universities and leads international workshops on Advanced and Computational Design in Europe and abroad. He holds a PHD at the Royal Danish Academy of Fine Arts, which he carried on at the Center for Information Technology and Architecture (CITA) with a topic on "Architectural Potentials of Additively Fabricated Heterogeneous Materials". He is currently professor in "Digital Design and Construction" at the Academy of Art of Berlin (UdK), where he holds the chair of "Digital and Experimental Design" in the Architecture department.

AN INTERVIEW WITH DANIEL DENDRA

A TRANSPARENT DESIRE

THE ARCHITECT AND THE COLLABORATIVE TURN

PHOTO © ANOTHERARCHITECT



Cad Logic
InFlatable
@ Moscow
Architecture
Biennale,
2011.

■ It is well recognized that top-down realization is one of architecture's main features. Open source architecture has overturned such founding principle, by making design processes more horizontal: this new approach seems to be a better fit to informal urban contexts. According to your experience, do you think it would be possible to apply an open source approach to the Western, over-regulated construction process, and how?

I think especially in the West where we have been living in an over-regulated world for a long time we got the possibility to break out

of this strict patterns without risking too much. If you look at Berlin for instance it is a city where un-regulated and un-planned bottom up processes formed a new culture that actually changed the urban landscape and formulated a new identity. The city administration knows about the opportunities of being more flexible in the consideration of existing regulations, and supported a more dynamic and process orientated urban growth. It doesn't matter whether we think about the West-East-South or North of the world - in general people are tired of non-transparent processes. Thus, a more, as you call it horizontal, or maybe bottom-up process will be the new mainstream development in future.

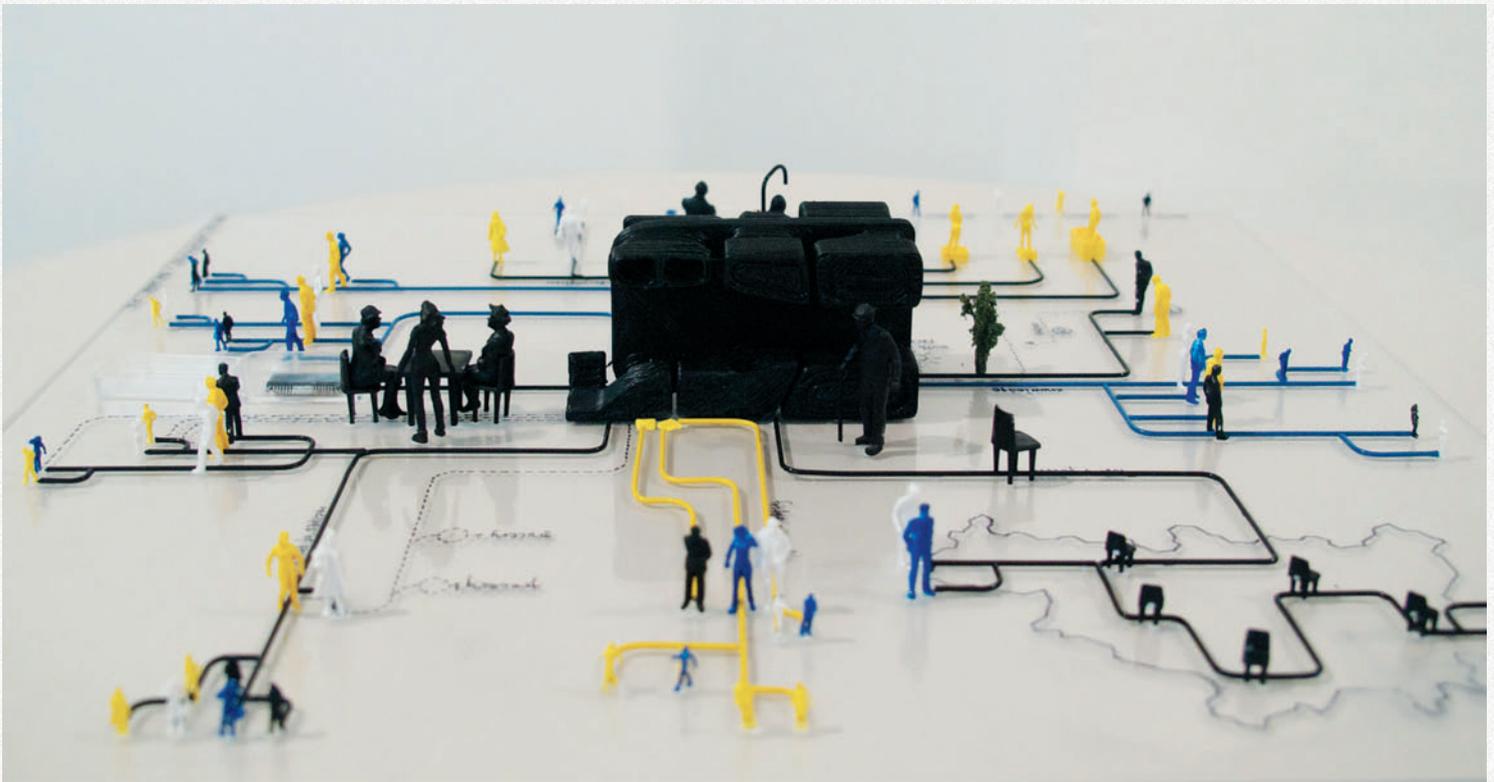
Since OpenSimSim to FutureCityLab, you and your network generated several open knowledge-based projects. Your wikis and sharing platforms are currently defining the state-of-the-art in terms of the relation between open source, architecture and planning. These projects are involving well known consultants in all fields of architecture and engineering. Could you tell us what is the general frame in which your network is inscribed, and what is the operational vision behind it?

We are experimenting with using different platforms and systems. For Future City Lab and also OpenJapan we used a self-developed wiki based on Drupal. Unfortunately, we had substantial problems with spam, and at the moment we are trying to implement media-wiki for our platforms. The same goes for any other system. Since all our projects are non-for-profit, at the moment we are depending on the help from other communities. Until now we had some support by the German Drupal community but we are also discussing possibilities of involvement of other developers.

Thanks to your work, the emerging scenario seems to envision designers engaged in creating knowledge and setting up networks, rather than in actual architectural design. In such context where ideas and projects can be transformed, upgraded and continuously remixed, what is the value you assign to the authorship of the designer? Quoting Mario Carpo, is traditional "architectural design ownership" going to meet the same destiny of the music industry, of daily newspapers in print, the fax machine or - you name it: the list of things we no longer need in the digital age?

Not only digital technology but also the so called (inter)NET-moment transformed a lot of existing and well established business models and industries. The same will happen sooner or later to both architecture and cities, it is only a matter of time. The emergence of fab-labs and desktop rapid prototyping will speed up this process even more. At the same time we should not worry to loose our costumers or work but we should be more progressive than the music industry and see the recent developments as an opportunity. Our current system of competition and corrupt industries is not in favor of pushing the boundaries of our profession. At the end you will earn the same if you are selling your design for 20.000 EUR to one client or for 5 EUR to 4.000 clients. With more than 1 Billion of Internet users today and 3 Billion in the next couple of years such business models are possible.

We should not forget that we as architects and urban designers have a huge task: we need to create cities and buildings that have ZERO CO² emissions by 2050. This is not much time if we consider that we have no solutions at the moment and also that the lead time of urban design is 20 years on average. ➤



OpenPod
(model)
@ 12th
Architecture
Biennale
in Venice.

➤ Increasingly, costumers are asking for new processes. With a large refractory company called Magnezit in Russia we are currently developing new architectural design by using actively co-working processes. This is a unique opportunity in order to implement some of the ideas developed within our research projects on a larger scale.

Current collaborative phenomena present contrasting operating methods and approaches. On the one hand, hyper-advanced platforms for design engineering and construction – as the one developed by Gehry Technologies for the Luis Vuitton Foundation in Paris – enable a wide amount of geographically dislocated technicians to work collaboratively on the same "Building Information Model" in real time. In this advanced digital chain, the decision-making responsibility is increasingly intended as a prerogative of a specific software application able to handle with such high complexity level. On the other hand, to act and design

collaboratively is instead widely intended as a manner of turning bottom-up the decision-making moments, improving overall accessibility for people within the design process. What do you think about these two contrasting aspects of collaboration? Will they ultimately converge?

I hope they will converge at one point. Of course such budget intensive projects like the one you mention have enough resources to invest in new ways of collaboration and decision-making, since this, in the long term, is saving money for the project. If we consider this the Formula One of architecture I wish these technologies filtered down to the "mass market". But we have to face the fact that architecture and architects alike are not very affine to new technologies. Just have a look at what buildings win the competitions nowadays and at which explicit tools most architects are using. Basically there is no such mass market. I don't think we should wait for new standards from the industries or rely on established offices.

Our only hope is new generations of architects willing to collaborate and willing to share knowledge. The development of new tools and platforms has to come from within this generation –in the same way it happened for the Internet and all its platforms. The new generation has to understand that there is a big opportunity for them to escape the existing map working systems of our profession: stop participating in competitions - start participating in collaboration. There are enough jobs out there: currently only 2% of the buildings worldwide are designed by architects. Stop competing with the established practices: discover new businesses since there is a big market out there. Around 20% of the gdp of each country is constituted by the building sector. We do not need

another Foster or another Hadid - we need a Zuckerberg of architecture, someone who will spearhead a new development and re-invest in the system. I am sure we are just about to see an internet-revolution of our physical cities, which will make it hard for some of the dinosaurs to survive. ■

interview by **Sabina Garcucci**

Hedronics
Chair
@ Moscow
Architecture
Biennale,
2011.



Daniel Dendra is a Berlin-based architect and researcher investigating the disruptive aspects of open source cultures, practices and methodologies in contemporary design, with a strong focus on the organizational dimension of architectural practices as well as on new strategies for future megacities planning. He well represents a lively reaction to the contemporary challenge that Design faces in our times. Dendra founded anotherArchitect (aA) in 2007, an award winning design studio focusing on sustainable design solutions in the built environment. Before aA he worked at various architecture offices in London, Moscow, Düsseldorf and Rotterdam such as Rem Koolhaas's A.M.O. and Zaha Hadid Architects. In the past years Dendra co-founded several crucial experiences in the realm of collaborative design, such as the Open-Source design network OpenSimSim, the Cloudscap.es award for sustainable design ideas, the post-tsunami design platform OpenJapan, and the open-source initiative for a sustainable future by 2050 Future City Lab.

A DIALOGUE WITH MARC FORNES AND THEVERYMANY™

TASTING THE DIGITAL SOUP

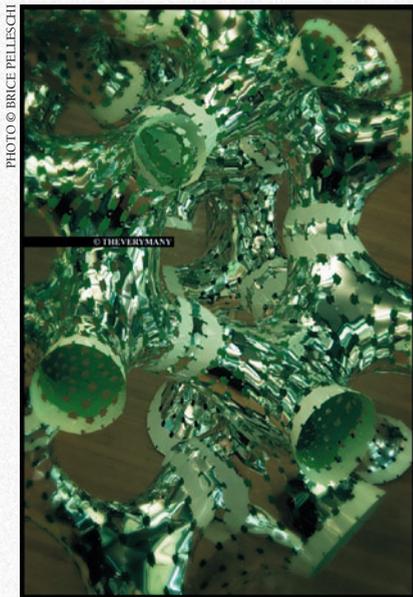


PHOTO © BRICE PELLESCI

Marc Fornes
& Theverymany™,
Polypesque,
2010-11,
Centre Pompidou
(permanent
collection),
Paris.

■ Where does the name "TheVeryMany" come from?

There are basically two meanings. The more obvious one is based on the understanding that every natural and human-made system is made of many elements and sub-elements. Our work is based on this consciousness: we are researching how we can break down any type of apparent complexity in the sum of simple parts so that we can make it actually happen. That is one aspect of The Very Many meaning. The second aspect recognizes that a designer is never alone while doing his work. From the pure design and the technical aspects up to making it happen materially, a design project is always the result of a

sum of efforts made by the many people involved. In our practice, the production part and assembly part always require to be handled by the work of large amount of people: we cannot appear as a single name since we are a creative collective group.

I describe your approach to design as a sequence of three phases. First a programming phase that allows to define computational protocol generating a complex geometry. Second a tessellation, realization via digital manufacturing and an assembly phase. Third a final speculative phase on the built model. What is the added value of the observation of a digital model translated into its physical shape?

For us it is really important to go outside the digital in order to realize the digital. This means that if you let your digital model to be influenced by any real environment, its digital part starts to reproduce existing models, computational models, and begins to describe what I call a "digital soup", namely: a "learning through our production" what we see around us.

I think that if you don't try to make it happen you bring yourself into a lot of problems. Your work suddenly becomes an empirical sequence of learning by trying/failing/redesigning. I think that jumping into the physical model is the only way to actually discover these failures, which are not necessarily evident unless you see a total collapse of the model. The more difficult failures to discover and to repair are all sort of small inefficiencies like an excessive time-consuming phase of assembly of the model.

If it is true that in computation it is possible to quickly generate massive complexity with few lines of code, it is also true that the gen-

eration of complexity is the easiest part of the process. We can say that computation is managed by two opposed vectors: one is the pure computational phase, few lines of code, easily generating deep complexity understood as a massive amount of data, and in architecture as a massive amount of geometries. Switching to the fabrication and realization of this model into the physical world means working with the opposite vector that is, is work with simplicity trying to increase the amount of repetitions and similarities to make the model realizable. This is the hardest part.

For me these two opposite vectors are complementary, not only to advance the physical but also the digital. The specific problems and tasks you have to face push you to become more efficient and to develop a very personal strategy in the design process. Hopefully, it is exactly through these issues that you find a very unique design language. I think the physical value is huge, it is the only way in which you can evaluate what you are actually doing in the digital world without only be self-referencing.

IF UNTIL RECENT TIMES DIGITAL MANUFACTURING WAS USED AS A PURELY REPRESENTATIVE APPROACH OF MODEL BUILDING, NOW IT IS BECOMING A TOOL TO REALIZE TRUE PROTOTYPICAL ARCHITECTURES. THE FORMER VISUALIZATION TASK HAS BEEN REPLACED BY AN OPPORTUNITY FOR A HUMAN SCALE EXPLORATION; THIS ASPECT PLAYS A KEY ROLE IN THE VERY MANY'S DESIGN AGENDA. WHAT CAN YOU TELL ABOUT THE RELATION BETWEEN COMPUTATIONAL PROTOCOL AND THE EXPERIENCE OF GENERATED SPACES?

In order to respond to your question we might have to define what a computational protocol is, within design. ➤

PHOTOS © FRANCOIS LAUGNE, BRICE PELLESSCHI, R. MARC FORNES & THEVERYMANY™



Marc Fornes & Theverymany™, nonLin/Lin Pavilion, 2011, FRAC Centre (permanent collection), Orléans, France.

➤ I think we might have to demystify the meaning of the word because, ultimately a protocol is just a very deterministic set of instructions that you write very explicitly. You use a syntactic computational language and you write a protocol within this syntax. A protocol is just a means of expression: the relation between design and generated spaces consists in how any designer finds its own way to express himself, a method explicitly described within the designed protocol. Computation is also a procedure to loop a series of those instructions and to loop them for many times. Actually, everything you write is ultra deterministic and this is very important because we all talk about Emergence and Complexity without considering that they are still generated using very deterministic stages. In the current scenario, designer's ownership within such a protocol is fully uncontrolled, which means that the generated space depends on how you design. In a way, I like to demystify the influence of computation within design. A common belief is that computation does a lot for a designer when I think that computation doesn't do anything at all, because you just write a text file, which is absolutely not smart, while the sum of instructions is smart and the computation is used to look through it. It is not a kind of puzzling black box doing things for you, it purely is a way in which you express yourself as it is English or other types of languages.

The materialization of complexity via digital machinery is one of the more exciting contemporary phenomena, leading imagination across a future-to-be reality. Actually, it is not easy to envision total free-form cities where social exchanges take place within non-linear digital based environments. Which kind of insights did

you get from your experimentations? Could you imagine how a forthcoming society can behave in "The Very Many City"?

Our design approach is very bottom up. Namely, we slowly build the overall process. We start from a small model and then we gradually jump to a larger model, then to a prototype, subsequently to an installation. From few installations, we produce a more structural one leading to the pavilion scale. What we call prototypical architecture is our current position; about the future...we never ask what is our own will. The Very Many are still trying to learn very slowly and carefully through this "test-try-failure-redo" growth.

"What is it?" is the question that we hopefully get when one person observes our prototypical architectures. In terms of spatiality it questions the meaning of a surface, of a depthless boundary, of a material system to the extent that people no longer associate it to architecture. Our work reflects the contemporary architectural debate but we are far from having yet an urban vision as the sum of The Very Many folies. I am very careful on this issue. We barely reached the pavilion scale, meaning that we are still far from a pure building and much farther from the idea of a pure city.

Tell us something about the concept of "Beyond Likely", the case study within Manhattan / NYC, based on Jurgen Mayer's Urban Future Award 2010?

The Audi Urban Future was a mere 10 days project in which they asked us to propose a vision of Manhattan in 2030. Our activity was based on the realization that urban time go faster than planning time and, unavoidably, when urban planning starts to get built or simply applied, planning intentions prove to be already obsolete in relation to our rap-

Marc Fornes & Theverymany™, Y/Surf/Struc*, 2010, Penn State, Paris.

idly evolving society. Due to its fixity a urban vision is basically obsolete the day you stop to think about it. We thought that Urban Planning has to go through a more bottom up approach in order to become able to collect a sum of desires to drive the urban environment around society. To simulate such type of growth in 10 days with a kind of feedback system, we created a sort of catalog of many variations around the theme.

These variations belong to the universe of tomorrow: we started from a sum of related boxes, drawn from the environment we are already living into, up to a world much more organic. Our direction was not that of mimicry of nature. In fact, we wanted to simulate a "continuity" where all those very differentiated local wishes of the inhabitant were merged in one smooth built environment. We were interested in a built environment that constantly adapt and re-adapt, that is, whatever you have already built needs to be able to sustain more load, or to be split into more habitations, or to be recombined as a sum of more units. In the perspective that everything is customizable, from color, material and shape, we tried to provide a universe where users have to learn and discover this potential and continuous customizability of space. It is envisioned as a dramatic experience where users have actually test first, try to understand it and then adapt the environment. We had this in mind when we built our Urban Future vision for AUDI. ■

interview by **Sabina Barucci**

Marc Fornes is a French designer and researcher, but first of all he is one of the leading contemporary figures in digital practices applied to architecture and fabrication. His seminal work defines the agenda of research, education and practice for the relationship between coding and design. He intensively collaborated with Francois Roche (R&Sie(n)) and with many outstanding studios such as SOM, Ross Lovegrove, Zaha Hadid Architects.

Under his own practice THEVERYMANY™ Marc has designed and built several large scale prototypical installations. "NonLin_Lin" pavilion is part of the permanent collection of the Centre Pompidou (Paris).

THE ART OF FREE AND OPEN SCIENCE

There is no field of knowledge production in which belonging to an institution is as important as it is in science. Or maybe there was. The so-called ivory tower of science, from where scientists isolated from society would produce and distribute their knowledge to the people, has proven bogus decades ago.

online distributed social production: cheap and diffused hardware connected to a distributed network (the Internet); collaborative software tools and services; broad availability of, and easily accessible data and information in the public domain; copyleft licenses that allow content reuse, modification and redistribution; a culture of participation. In fact, the diffusion of collaborative web tools and deeper transformations in the way science is conducted have given people new tools that enable a proactive approach to information production and to the shaping of the techno-scientific environment in which they live. But besides being part of a global change in the way knowledge is produced, science has important peculiarities. In this field, the rise of open collaboration involves blurring the boundaries between scientific experts and lay citizens: this is a problem of power that necessitates a transformation in the epistemology of the science expert. Citizens are more and more commenting, discussing, deliberating and producing scientific knowledge.

■ We discovered science to be a very social enterprise, with all the problems, battles, uneven power distributions, links with complicated networks of other actors that characterize about any human activity. Well, but if you do not have a Master's and a PhD, and have not studied for years, can you be a scientist? Deciding who is a scientist, who knows, who can speak the truth, has always been an activity of primary importance. These discriminating boundaries are falling down, like the ivory tower's walls. More and more, people want to conduct experiments and have their say regarding the direction science is taking. More and more people want to be scientists even if they do not have any PhD. Technological and cultural changes are somehow putting science through the same type of transformations that art had to face in the past: the end of the elite control over cultural production. At least, this is how the enthusiastic claims about do-it-yourself science and biohacking present the emergence of a new movement of non-experts that is trying to build cheap and open source tools and infrastructures for experimenting and sharing scientific knowledge. Add the fact that biohacking experiences are full of artists who want to use active approaches to life in order to criticize the current system of life sciences research: this relation between do-it-yourself biology and bioart is very promising, as a cultural response to the domination

of big corporations and transnational universities (what biohackers call Big Bio).

In this section we will present the changes that science is facing due to the emergence of peer-to-peer production models, in which free access to forms of horizontal participation guarantees that people can engage as peers. In one sense, garage biology is part of a well-known story: the emergence of online platforms for the open and collaborative production and sharing of information and knowledge. Garage biology is based on the same premises that allow the existence of an

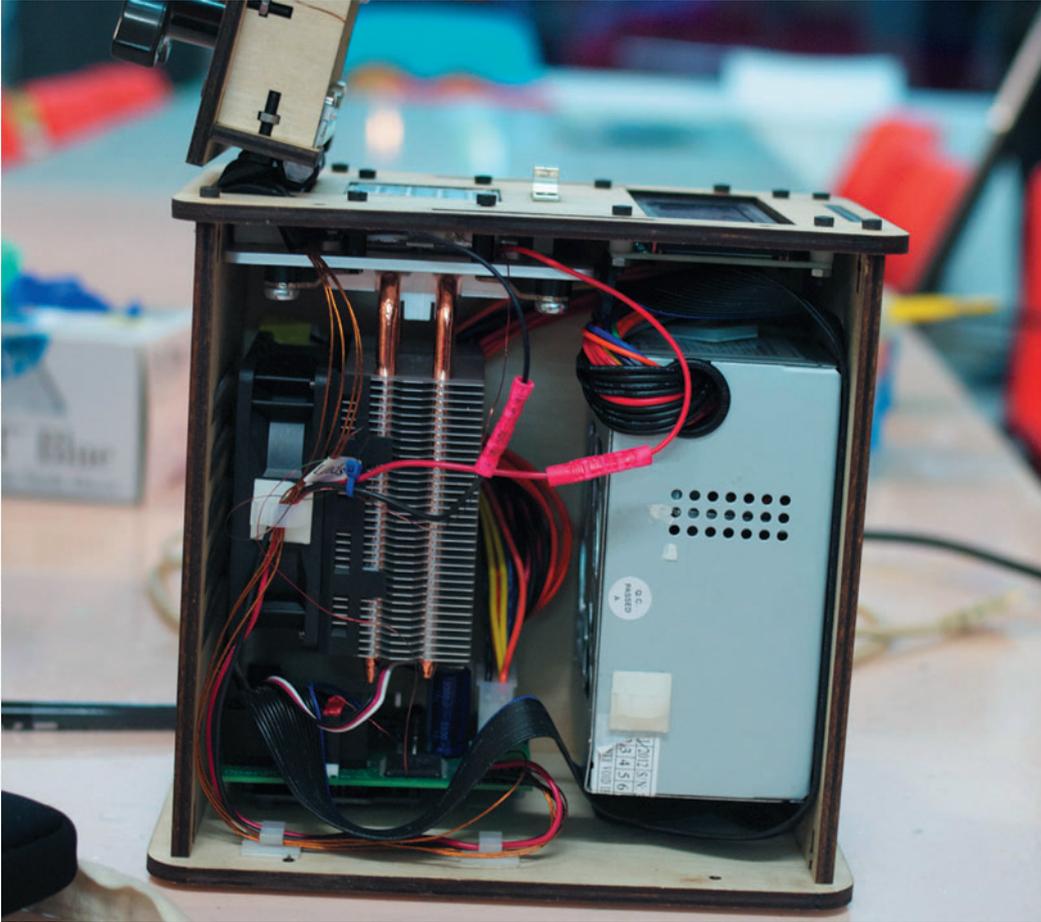


Meredith U. Patterson @ the 27th Chaos Communication Congress (the annual four-day conference organized by the Chaos Computer Club in Berlin), 2010.



PHOTO (CC) R.R.

PHOTO: (C) F.R.R.



PCR Challenge / MadLab UK.

> In this changing scenario, the emergence of do-it-yourself communities that work on biology and genetics is one of the most visible innovative stances. The most famous one is DIYbio, a community of biohackers established in Boston in 2008 and now represented by local groups in dozens of cities around the world. This so-called “garage” or “citizen” biology is conducted in odd places such as garages or kitchens. During the last two years DIYbio has become an important movement spreading all over the world. Interestingly, an important part of DIYbio is composed by bioartists interested in the political potential of the diffusion of biology to lay citizens. Some claim their use of open source tools, their relation with hackerspaces and their political attitude are important features that are shaping the way science is done in today’s societies.

This makes DIYbio and other related projects a very interesting example of a direct translation of free software and hacking practices into the realm of cells, genes and labs. For example, their models are hackerspaces, collectively run spaces that are now widespread in Western and Asian countries, where people gather to hack, talk about and work on computers; spaces where community members that share the same political approach to computers or subscribers for a low individual monthly rate can find com-

puters, tools, and other people interested in hacking. Sometimes, when they cannot open their own labs, DIYbio groups collaborate directly with existing hackerspaces in order to set up small labs, or “wet corners” among the computer hardware that fills urban hackerspaces. Some of their skills are acquired by working in “ghetto labs” in universities that were not well-funded. They recycle old machineries using free software and Arduino. They apply artistic creativity to hacking life science labs. DIYbio groups are also immersed in a dense entrepreneurial environment where start-ups and new open science companies try to navigate their way through the dominance of the Big Bio market. Will they be able to open themselves up to a more inclusive relation to citizen science? Well, if they won’t, they might have to face rebellion, at least according to some biohackers. In her *Biopunk Manifesto* the hacker and DIY biologist Meredith Patterson pompously (and ironically) states: *we the biopunks reject the popular perception that science is only done in million-dollar university, government, or corporate labs; we assert that the right of freedom of inquiry, to do research and pursue understanding under one’s own direction, is as fundamental a right as that of free speech or freedom of religion. The biopunks are actively engaged in making the world a place that everyone can understand. Come, let us research together.*

This process of de-institutionalisation is not free from political consequences. Critical Art Ensemble (CAE) has been one of the first protagonists of what is now the broad emerging movement of DIY biology practices related to art. In its contribution to this section, CAE presents the purposes of its participation to bioart, which are more straightforward than those of most other projects. CAE wants to take biotechnologies out of the hands of corporations and militaries, and repurpose them to work for the common good. Bioart, public experimentation, citizen science are tools to invent a new biopolitics, one that eludes the “agents of capital” control and their attempt at recoding life in their interest. Grassroots alternatives such as biohacking and DIYbio are at the core of a possible, different development of a global biopolitical ecology. In the second piece Sara Tocchi inter views Hackteria, a global art network of people that practices what they call *open source biological art*. Their workshops have taken place in Europe and Asia. Marc Dusseiller, one of the founders of the collective, illustrates Hackteria’s tactics to open bioart to anyone and to allow collaboration between artists, hackers and scientists. Hackteria’s point is to enable people to collaborate, produce and share scientific knowledge without the support of an official institution. Both science and art, in their view, should be subtracted from elites’ and experts’ control. Demystification of science could be the by-product of open source biological art, as it gives lay people the tools for understanding and participating to the life sciences enterprise. In the last contribution we discover one of the weird places where communities of biohackers, artists and scientists collaborate on do-it-yourself biology projects. Eric Deibel’s article focuses on La Paillasse, Paris biohacker community. Based in the outskirts of the city, La Paillasse is a physical space where biohackers’ creativity can be expressed outside the walls of “big biology” labs. The availability of basic tools for conducting biological research, the adoption of open source policies, and the convergence of art and hacking practices make La Paillasse a great example of the cultural response to the Big Bio domination that biohacking wants to represent. Critical Art Ensemble ends its piece with an invitation to “the public lab”. If we had more public labs, places where art, hacking and citizen biology converge and contaminate each other, more people would acquire specific critical skills to understand and interact with the life sciences. Or, in the worst-case scenario, we would have lots of fun. ■

Alessandro DeFanti



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BIOTECHNOLOGY IN THE PUBLIC INTEREST

Two technological revolutions have fundamentally changed the world over the past quarter century—one in Information and Communication Technology (ICT) and one in Biotechnology. The former is far more celebrated, as it is such an essential part of everyday life for people in developed countries. Its impact is immediate and ubiquitous.

■ Service workers, bureaucrats, technocrats, business people, and students spend a greater and greater proportion of their waking hours looking into screens and tapping on keyboards. Biotechnology is seemingly far less omnipresent. It appears to be far from everyday life because its development and production takes place behind laboratory doors, and are understood only by a specialized cohort of scientists. As we shall see, this understanding, while correct, is quite shortsighted. Critical Art Ensemble will even go a step further and say that while the revolution in ICT is far more spectacular, the revolution in biotechnology is fundamentally more profound and equally ubiquitous.

Critical Art Ensemble realizes that this is a very bold assertion, since even upon a cursory glance anyone can see how ICT has ev-

olutionized the world. Most significantly, it has made possible a final form of capitalism: pancapitalism, an economic hegemony that is truly global in scope. Interlocking and interdependent global markets are now a reality birthing global transnational institutions that operationally function under no authority but their own. Using the increasing virtualization of all dominant forms of human activity, whether we are speaking about economic exchange, warfare, entertainment, or even simple sociability, pancapitalism has managed to produce a globally dominant general ideology (neoliberalism) in which the categories of enterprise and profit become the lens through which all value is assessed. Given this spectacular, inescapable, ideological and economic envelopment made possible by ICT, how can it be anything less than the greatest revolution of them all?

Critical Art Ensemble believes that as with all spectacular phenomena, this revolution is reducible to the question of quantity. The ICT (digital) revolution ultimately brought us more of the same, but on a vastly larger scale. So while we haven't seen global empire, spectacle, or markets before, we have seen vast empires, spectacles, and markets. On the other hand, Biotechnology is not only vast in its many manifestations, it is also genuinely new. Beginning with quantity, biotech touches on everything organic, and thereby is also truly global. For example, its impact is continuous in the food supply chain. In terms of everyday life, the products generated through biotech are everywhere, from our kitchens to our medicine cabinets and our bodies and for a small group of people biotech is the reason they exist at all. But biotech's real significance has to do with quality.



Critical
Art
Ensemble.

➤ Pancapitalism, like other power formations before it, has never been able to fully control human interiority. It can envelop the body and consciousness and try to push its imperatives into them, but it has never been able to control thought or desire with any reliability. Certainly, it has made great strides at pushing its way in, but no magic formula has ever been found to make people desire what they do not need, or serve without resistance. Even the simplest advertising campaign is never a certainty. It may work to displace desire from fundamentals typically hardwired into humans needs like food, sex, shelter, belonging, and alternate states of consciousness and onto superfluous items, but it tends to work only for brief periods of time and often fails altogether. The steady stream of focus groups that accompany advertising campaigns is clear evidence of capital's awareness of this uncertainty. Biotechnology can help to optimize this process, and not just through humans. It can greatly aid in the recoding of every organic system and every creature so they better conform to the imperatives of pancapitalism.

New advances in molecular biology have set this recoding of life into motion. To return to humans, those interior elements of consciousness we once thought inviolate are now open territory. The means to take the imperatives of neoliberalism and transform them into predispositions that could push outward to link up with the sign vectors pushing inward now exists. Given capital's propensity to optimize and rationalize everything it touches, we can be certain that the body's interiority is in its sights.

Capitalism has long shown its interest in engineering life, with perhaps no greater ferocity than in the eugenics movement of

the early twentieth century. The desire to displace the blind, groping process of evolution and replace it with rationalized choices better aligned with the needs of capitalism has been an ongoing dream, and now the knowledge and the means to do it are available. Already many varieties of creatures are being recoded; however, serving the needs of power and selection for survival are two different things. Selection can only be speculatively understood post-facto, and thus cannot be engineered in advance, so we never know what kind of good or what kind of damage engineers are doing to a particular species or for that matter, an ecological system. Even if this problem were somehow avoidable (and given capitalism's record that would be surprising), we can be certain that capital is hoping to privatize life itself. A disturbing thought, and a reality already well underway.

In spite of these nightmarish tendencies that are the byproduct of neoliberalism, biotechnology could have utopian consequences. If it could be taken out of the hands of transnational corporations and militaries, it could be repurposed to work for the common good. For this to happen, biotechnology has to be reimagined and repurposed as something other than tools for the colonization of life, and that will only happen if those who are outside the immediate gaze, tutelage, or payroll of the agents of capital are willing to engage this challenge. (We should add that there are some scientists willing to assist biohackers in this endeavor, but they are not common.) The task is not easy, because participants will have to remove the blinders of enterprise and profit if they are to be successful. Moreover, they will need to participate in this activity in a manner that is beyond the pleasure of investigation and satisfying curiosity. Those who are able will

have to frame the endeavor as a willful intervention against an unacceptable form of biopower or more positively, as a means to invent and deploy new forms of biopolitics.

It's not science, but it looks like science. The forms of biointervention and biohacking that have social value have little to do with producing scientific knowledge; rather, they are about producing a politics that stands in opposition to the recoding of life in the interests of pancapitalism. The production of scientific knowledge is out of reach for those who are not independently wealthy. Science is a capital-intensive enterprise that costs millions, often to produce only partial results. The cost of cutting-edge hardware is prohibitive (often because it cannot be optimized due to the low number of units sold), and the cost of wetware is no better. Biological reagents, micro liter for micro liter, are perhaps the most expensive substances on earth. Moreover, this endeavor requires a large community that has reached consensus on what constitutes legitimized process for cross-checking results for validity and reliability. In the overwhelming majority of cases, garage tinkers are not going to be able to join this club.

Given these limitations, what can be done? To start with, if all one wants to do is explore the basics of molecular biology, that can be done in a limited (because of the cost of reagents) manner at a reasonable cost. One thing capitalism is very good at is optimizing popular products to bring the price down (unfortunately this seemingly positive practice is usually combined with the pilfering of the labor of the poorest, most vulnerable, and most desperate people on earth). Lab basics such as shakers, incubators, centrifuges, PCRs, precision pipettes, etc., are readily available and affordable for those who

have income to spare (particularly if you buy used equipment). Or, as Graham Harwood would say, *those without money can nick it*.

In addition, many processes have also been optimized, and in many cases come in easy-to-use kits. Labs are like any other capitalist workspace in that labor is thoroughly stratified. It's not optimal for the managers (PIs) to be doing lab work. They should be developing theories, inventing experiments, interpreting results, and writing grants. Cheap labor is what is needed, i.e., students, more commonly known as "lab monkeys". They need easy-to-follow instructions. What this means for interested biohackers is that without knowing the theory of what you are doing, a valid result can still be achieved (so no, you don't need a Ph.D.). Perhaps people want to know if their breakfast cereal is made with genetically modified corn there is a kit for that available at science supply stores. Just follow the very detailed instructions. However, you must make sure that your lab is outfitted correctly for the kit always check on what a given kit requires before purchase. The foundation is now laid: we can appropriate equipment, process, and limited amounts of knowledge, and turn them to our own needs.

Now we come to the creative part of our process. What can we do with modest means? To answer this question, Critical Art Ensemble's suggestion is to turn to the history of art for answers, and in this case to one of the great culture hackers of the twentieth century Marcel Duchamp. Early in that century Duchamp produced a series of readymade sculptures in an effort to disturb and disrupt mythic beliefs about art, i.e., that humans call art into existence through a transcendental creative act that is beyond the social sphere. Duchamp believed that art had no transcendental or essential qualities, and readymades were his proof. He took functional, manufactured items such as a bottle rack or urinal and repurposed them as art. Believing that meaning is determined by situation rather than essence, he placed the objects on a pedestal, in a museum or gallery, and signed them. The interrelation between the space, the pedestal, the object, the signature, and the viewer all signaled the legitimacy of the objects' status as art, and as such, they were looked upon and treated as art. This reassembling of points of meaning to produce new relationships to common objects is the model that biohackers can use to produce new perceptions of, thoughts about, and relations to the organic world. (Or, as William Gibson writes, *the street finds its own uses for things...*) Biointerventionists need to find our own uses for the tools of molecular and cellular biology to repurpose them as decolonizing and liberating processes and objects.

With equipment and production models out of the way we can proceed to explain why we have such faith in the amateurism of those engaged in DIY, rather than in specialists, to

lead the way in repurposing the tools and processes of biotechnology. The primary reason is that amateurs do not have a conflict of interest. Their interests are their own, and do not have to align with corporate or military interests. As noted earlier, science is an expensive enterprise (and we do mean "enterprise"). The money has to come from somewhere, and only three sources are available: the military, the government, or the corporations. This means that research agendas must be aligned with the agenda of one of these institutions. For any of these investors to continue to funnel money into labs, they have to be getting a return (either monetary or symbolic). This puts scientists under constant pressure to show practical results. Knowledge is not enough; there has to be practical (profitable) application. Unfortunately, practical reality tends to drive research more than knowledge for its own sake, although some scientists have become skilled at hacking funding by disguising their research with a stratagem a popular tactic with researchers exploring space is to say their work will lead to a moon station. Amateurs are completely out of this loop, and can turn their attention anywhere. Amateurs have the potential for far more creative vision at an everyday life scale. They are not burdened with history, standards, collegial scrutiny, institutional survival, and socialization to lab life. They can reassemble and repurpose free of the disciplines' repressive mechanisms.

A pedagogical dimension is also part of this alternative to the science of pancapitalism. Earlier, Critical Art Ensemble mentioned the problem of alienation. Biohackers can help to demystify molecular biology, by producing projects that demonstrate that basic knowl-

edge regarding issues of application and deployment of biotechnology is available to and can be easily acquired by the public. If we fail in this initiative, biotechnological public policy will not be created through democratic process, but through the current oligarchic process, where corporations do as they please, by creating their own research and safety standards and then policing themselves. As with all alternatives to the rule of pancapitalism, they must come from the grassroots. So much is at stake at this moment in time. BioDIY biohacking, biointerventionism, or whatever one wants to call it has a far greater charge than self-amusement through garage science, but has an important place in the development of a democratic biopolitics, future forms of life, and the health and diversity of the global ecosystem. Critical Art Ensemble hopes to see you at the public lab. ■

Critical Art Ensemble

Critical Art Ensemble (CAE) is a collective of five tactical media practitioners formed in 1987 and devoted to exploring the intersections between art, critical theory and science. The group has exhibited and performed at diverse venues internationally, ranging from the street, to the museum, to the internet. CAE has also written six books. *In Molecular Invasion* (Autonomedia 2002) CAE offered a model for the creation of a contestational biology driven by active intervention in the organic realm. Web: www.critical-art.net/

Free Range
Grain



PHOTO © CRITICAL ART ENSEMBLE

INTERVIEW WITH MARC DUSSEILLER

HACKTERIA

■ **Could you tell me something about the history of Hackteria and how it is changing over the years?**

The three of us met in Madrid during a large workshop organized by the Medialab Prado called “Interactivos?09: Garage Science”, on how the open source and citizen science approach can change society. During the workshop we decided that we need a type of organization and activities that will bridge the gap between the popular bioart practices and the emergent DIYbio/citizen science approach, and Yasha came up with this funny name Hackteria. We organized our first Hackteria workshop in Berlin on how to use DIY microscopy for sound interfaces. In 2010 HackteriaLab started a series of expert gatherings during which we evaluate what was done and establish new collaborations. Right now we have Urs Gau-

denz in Lucerne working closely with SGMK on new workshops on laboratory infrastructure, then Brian Degger, who co-founded a Hackerspace in Newcastle, doing a lot of playful bio-experiments, then a DIYbio geek from Germany, Rudiger Trojok, who will move to Copenhagen soon to start organizing workshops in the local Hackerspace, BiologiGaragen, and Denisa Kera, who is starting some collaboration between Prague based Hackerspace, Brmlab, and the Hackerspace in Singapore.

Why is this focus on the world outside of the Laboratories important for Hackteria?

Rather than having just one citizen science laboratory like a typical Hackerspace, we developed a strategy of mobile labs, which can be installed and transported anywhere in the world: art studios, art centres, or even

unexpected places like jungles or streets of Indonesia, where we have already performed and further developed some science experiments. The mobile labs help us understand how these future technologies will interact and influence our everyday life and practice in very different contexts. Most Hackteria work is very process-oriented and open-ended, we like to improvise in new locations and with new people, which often results in unexpected, creative projects. Doing “science” and experimenting with technologies in the DIY manner on the streets, in the art centres or various other locations helps us understand what are the challenges and limits and how to create tools and processes that will simply enable more people to enjoy research and tinker around with “expert” knowledge.

Could you describe some recent Hackteria project, which embodies this type of vision and practice?

On our wiki you have over a dozen of people contributing and describing their ongoing projects, so right now there are over 45 projects starting with simple instructions on how to build a laboratory infrastructure to more sophisticated descriptions of lab protocols on how to work with different living systems. You can learn some basic DIY techniques of growing bacteria and algae or start your own microscopy project with a simple set of instructions on how to turn a cheap webcam or a Playstation3 Eye camera into a DIY microscope. The microscopy project is very popular but also useful not only for science amateurs and artists but also for people from the developing countries with limited access to expensive lab equipment. The microscopy project is also a good example of how we work, we like to hack consumer electronics and hardware to serve a new purpose. We transform these symbols of our enslavement to the media industry into emancipatory lab equipment, which can enable anyone to explore and observe nature, specifically the world of the microorganisms.

And how have you seen other themes and practices evolving during these years?

We are starting more projects in bioelectromix, but we will also continue our work with DIY

Plant
Smela.

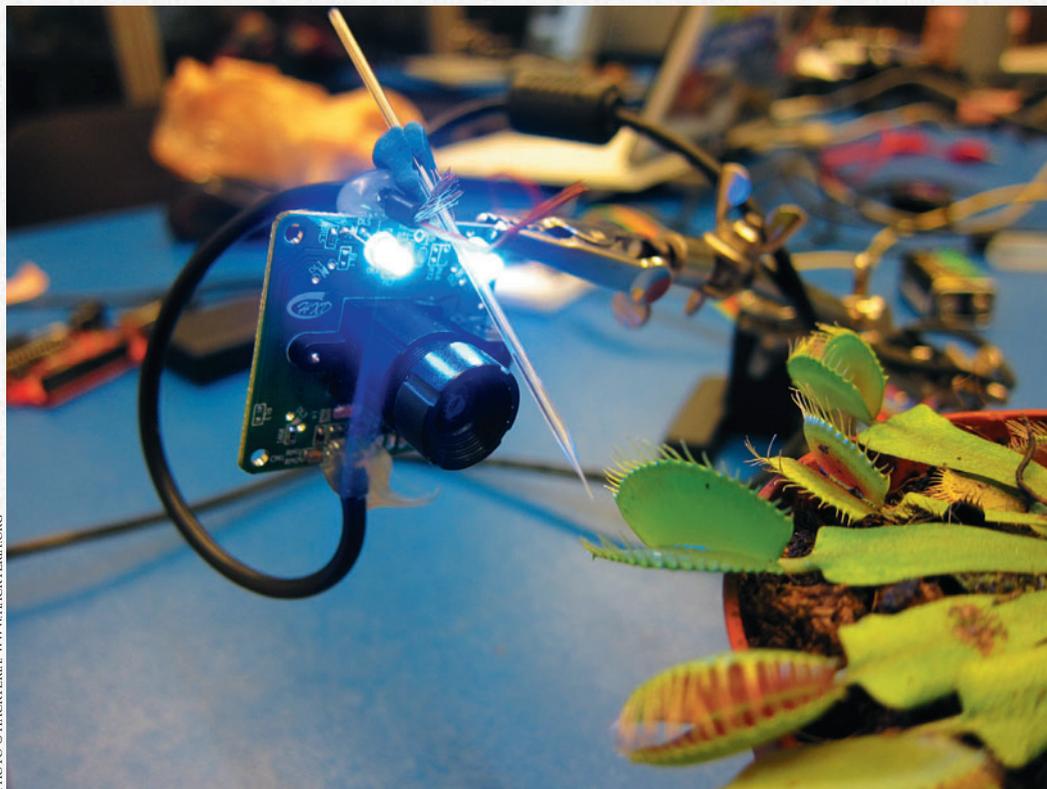


PHOTO © HACKTERIA WWW.HACKTERIA.ORG

microscopy and synthetic biology. We would like to start experimenting with biofuels for which we are building a bioreactor to grow algae using an Arduino. Many of our members are still very keen on fermenting wines and even various gardening projects. The microscopy project will likely evolve into attempts to create a bioprinter to print fungi or bacteria. The laboratory tools, such as incubators, pipettes, centrifuges and others are still the core of our activities, because I think it is essential to be able to set up a laboratory wherever you are. During the last year I have been building simple kits for 'lab-in-a-box', a mobile biohacker suitcase. This January in Indonesia we even transformed a local street food truck into a semi-functional biolab, with which we performed simple scientific experiments with microscopes, sterilization, but also molecular gastronomy experiments like spherification.

Could you explain what is Open Source Biological Art and how it relates to DIY biology?

Whether it is a wiki or a workshop or both doesn't really matter, what is essential is to enable people to collaborate and share knowledge and instructions. Open Source Biological Art enables people to perform complex scientific protocols without the support of an official institution. We believe that it is important to enable more people to feel confident in working with living systems in order for creative and new ideas to emerge. When applied to science and art, it can create a new type of public participation and understanding of both domains. Artists nowadays rarely share their precise instructions on how they did something. They simply think the documentation of their process is not important, and that the role of the public is to be just viewers, passive consumers and admirers of their works. In this respect, so-called bioartists are a little bit like scientists creating their own ivory towers. We think this is very old fashioned and actually wrong because it creates the wrong impression that both science and art are something practiced by certain experts and elites that will decide on our future. Our approach is radical, we believe that everyone should be actively involved in the future of biology and science, and that amateurs, tinkerers and hackers should have an equal access to the tools of art and science "production".

Why is it important to bridge the gap between artists and scientists and how it relates to the discussions on the relation between experts and lay people?

I am very interested in improving science communication and public participation in



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the life science. I would like to see a type of democratization of science, which involves citizens directly rather than leaving the whole discussion to some NGO, media or professional science communicators who will represent and mediate their voices. My hope is that by enabling more people to do science in their garages, kitchens and bathrooms, and by enabling more artist, designers and simply enthusiasts to work on various scientific projects, we will create a scientifically literate public, which can democratize decisions on stem cells, embryos, GMOs, nanotechnologies etc.

And what is your relation to the DIYbio scene? On what type of projects do you collaborate and how do you differ from them?

Hackteria was part of the global DIYbio movement right from the beginning and our activities were always overlapping. Two years ago when DIYbio.org was still starting I met Mac Cowell, the founder of the movement, and invited him to one of our summer camp, and we collaborate and help each other quite often. The difference is maybe that the DIYbio.org is more like a mailing list with many functions, while we are primarily a wiki with instructions on how to build things, and also we organize a lot of workshops and events, which are not that essential for the core DIYbio movement. Another difference is that they are much more science and business oriented while we engage much more with artists, designers and even philosophers. Hackteria's educational and wiki resources are essential in helping artists and designers to gain confidence so they can later go on any science related mailing list, pose more specialized questions and communicate with

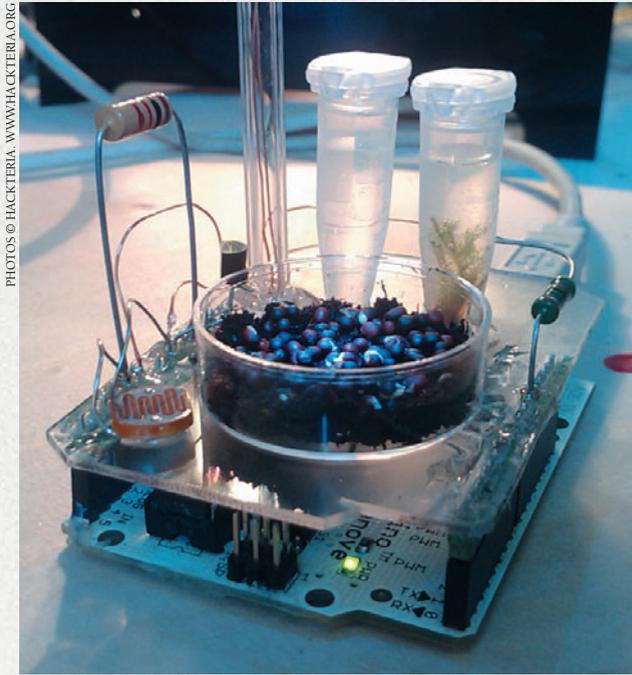
the scientists. The relation between Hackteria and DIYbio creates this nice synergy and opportunity to support unique collaborations.

Could you explain how you imagine the ideal relation between professional scientists and citizen scientists?

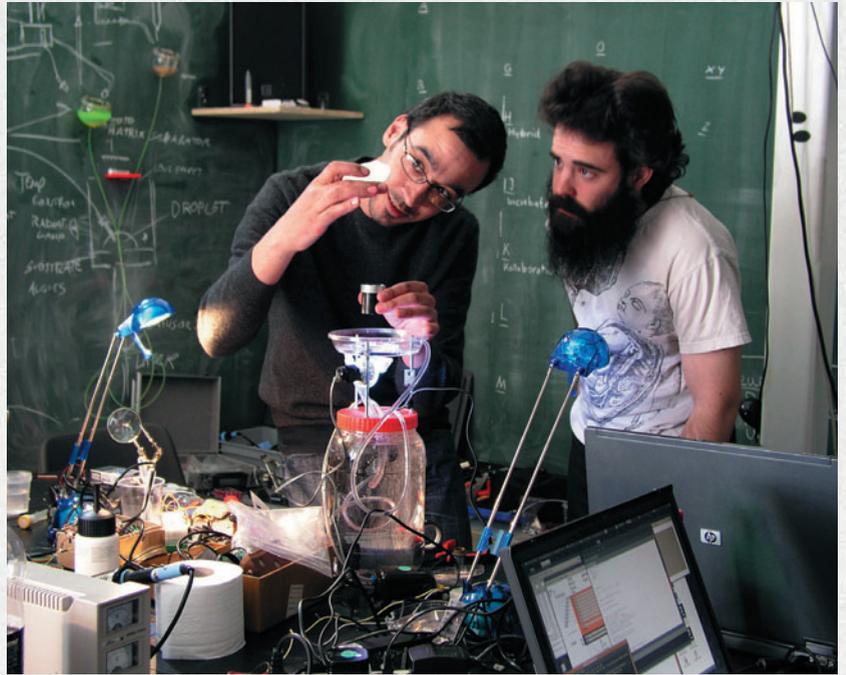
When I visited Yashas in India for the first time, I realized how important is the DIYbio work we were doing in developing countries. There, science equipment is too expensive and scientific publications basically inaccessible. The Hackteria wiki enables students in these countries to gain research skills with some of the DIY tools we have developed, and we are constantly developing new tools. Many of our members are actually professional scientists, who took the DIYbio challenge seriously. They enjoy developing instructions and tools for people who for various reasons can't afford or don't have access to a professional lab space. DIYbio tools may never produce a cutting edge research but they play an essential role in the education of scientists and basically anyone who is trying to understand what is happening in professional science labs. DIYbio protocols and tools are means of science emancipation, a type of individual freedom and even right to develop your own, personal relation to scientific knowledge and to try new things, so you can make an informed opinion about such issues. Hacking stuff and making cheap tools to start your own laboratory and infrastructure will democratize science in this sense. It creates an opportunity for developing countries to improve their science education and research, which is meaningful to themselves and not to some peer review, Western journal, which is anyway inaccessible.

Ars Daphnia Circus.





Hresse Shield.



Working in Lab.

➤ **Who are the people who participate in your workshops?**

It depends on the venue and the location. If it is a media art festival, the majority of the participants will be “technology and science oriented” artists and some engineers working on an art project but mostly those who don't have much experience with biology so they are reaching out and trying to learn something different in a friendly environment. Sometimes we also work with children. In India or in Indonesia we were also successful in attracting the local villagers and communities, and there we often work with some local organizations that have similar goals. In Indonesia there are organizations such as HONF (House of Natural Fiber) and

Lifepatch.org that often involve local farmers and use some of the Hackteria methodologies, our DIY webcam hacked microscope, or protocols for making wine and fertilizers. Also Yashas is working with local villagers in India, teaching genetic manipulation and synthetic biology by using comics books, which speak to the general public.

Tell us something about your personal projects under Hackteria

For the last two years I have been doing a lot of work in Slovenia on nanotechnology and biology with Kapelica Gallery, a prominent institution at the interface of art and science. We started with the NanoSmano project in 2010, which was a participatory public lab for experiments with nanotechnologies and their aesthetic potential. For two weeks a small group of science experts and artists were working on developing nanotech prototypes while the lab was open to the general public. With Kapelica we are also planning a series of workshops with children and we are setting up a mobile lab. I'm also active in Indonesia, where I have been organizing workshops for the last three years on DIY microscopy, fermentation, science outreach for local schools but also science and VJing events with the booming art scene. Meanwhile they started a new project called Lifepatch.org, a citizen initiative in art, science and technology with a wiki very similar to ours but in Bahasa, so we are cooperating on many projects. It is very gratifying to see how the network is spreading, mutating and interacting around the globe.

What is your view on the future of citizen science?

My hope is that if more people are making things with their hands and have this direct and everyday experience with scientific protocols, we can demystify science and open the whole decision making process to more people and opinions. I think this is the future

society, where I want to live, a place where tinkerers and lay people find new and unexpected uses and functions of technologies and scientific knowledge, where they hack it and adapt it to their dreams and lives and don't wait for some big corporation or government to decide what is good or safe for them. Because I'm also working as an educator, I have the opportunity to see how the attitude to science changes with direct experience. I think scientific institutions should spend more money teaching people how to do science and open their labs to the public rather than pay specialized science communicators to do some PR campaigns, which only create more suspicions. ■

interview by Sara Tocchetti

Cyber
Oechslemeter.



Hackteria is a network of people practicing DIY (do-it-yourself) biology with an interest in art, design and interdisciplinary cooperation. The network was founded in 2009 by Yashas Shetty, Andy Gracie and Marc Dusseiller and now includes not only scientists, engineers and artists, as you would expect, but also philosophers, entrepreneurs, and even foodies and chefs. Hackteria operates on a global scale, and is based on a web platform and a wiki for sharing knowledge, which enable anyone to learn but also test different ways of hacking living systems. Hackteria is not based in a physical space, and its goal is to allow artists, scientists and hackers to collaborate and test various biohacking and bioart techniques outside the official laboratories and art institutions, basically anywhere in the world. Web: www.hackteria.org

BIO-HACKING WITH LA PAILLASSE

ON THE ART, SCIENCE AND POLITICS OF DOING-BIOLOGY-YOURSELF

If the figure of the biohacker refers simply to those that are politically and aesthetically invested in technical practices at the interface of computing and (molecular) biology, then it should include the fledgling community of bio-hackers at La Paillasse.

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La Paillasse
/ Team

■ La Paillasse recently celebrated their inauguration in a suburb of Paris. Next to railroads and old buildings that evidently will be demolished at some point in the near future, their “do-it-yourself” attitude is self-evident when looking at the tools that are everywhere, either in use, under construction or lying around in parts. Of course most of the equipment is hardware of various kinds that has been gathered to create a “hacker space”, but there are also some workbenches with microscopes, a centrifuge, a spectrometer, incubators as well as the more mundane vials, refrigerators and microwaves. Most of the equipment is old and might be considered obsolete. But make no mistake, this is no less a place of creativity as the iconic laboratories of “big biology”; it takes a lot of creativity and perseverance to set-up a laboratory for next to nothing and without copying the research agendas of “big biology”, or attempting to become as similar as possible to inventors in white coats working in sterile and disciplined environment and using state-of-the art equipment. Certainly, the appearance of ‘doing-biology-yourself’ at La Paillasse does not resemble the pretty images on the websites of institutes of excellence and corporations, but

the question is whether a biological laboratory that is part of a sub- or counter-culture of hackers corresponds to a kind of creativity that somehow challenges the typical “wet-labs”, as exclusive and asocial spaces. Specifically, there is its older sibling’s exemplary reaction to the commodification of source code; where does the example set by free and open source software development lead when the object of curiosity is not solely the creation and modification of source code and the hardware it runs, but is about living and working with forms of life as knowledge, as a technological creation, as art and otherwise?

La Paillasse as a starting point....

Let’s begin with some of the many thoughts going around at the Thursday evening meetings of La Paillasse. Of course everyone is welcome to join in with the diverse group of individuals who are passionate about devel-

opments in the life sciences. It is not necessary to distinguish who exactly might be identified as a life scientist, as a programmer or as a student, citizens or artists interested in social aspects of science. It is likely that those in attendance will end up identifying with at least a few of these figures in the course of the evening, regardless of their level of experience. This is also what “doing-biology-yourself” means. The barriers to becoming active in biology are extremely high; the knowledge required is about keeping track of the rapid pace of technical developments and mastering the skills and knowledge that are necessary to work with instruments, taking them apart and using them in experiments. In other words, DIY-bio focuses on the construction of a laboratory with basic tools for anyone with a basic attitude towards experimentation. This laboratory is actively being rendered as a social space that is as inclusive as possible. ➤



Neurohack,
Psyche DeLight (performance)
@ La Gaîté Lyrique, Paris
04/2012. Created by Sam
NeuroHack, Katerina Saponenko
& Franck Weber.

PHOTO © FABRICE DEUTSCHER

La Paillasse
/ Team

➤ Many of the examples being discussed at La Paillasse illustrate this. The thresholds to the participation in registering and cataloguing the interaction of biodiversity and genetically modified organisms are low. Of course this process requires tools that are able to do so and that are simple enough to make it possible for anyone to collect credible data. For example, La Paillasse has initiated a project about the properties of algae. Algae are increasingly the focus of an influential research network that investigates new bio-fuels. A sample costs little and with a bio-reactor and some practice it is possible to generate electricity. Sometimes it is the simplicity of the technique and the proximity to materials encountered in everyday life that are important, like creating paper or simple plastics out of micro-organisms. Other times, however, DIYbio cannot be distinguished from BioArt. For example, the interaction with algae could also be transformed into music. Why not “listen to life” by developing software to record variations of sound and luminosity of algae-cultures? The result is then the recording of any change, generating sounds in response. The digital domain inhabited by the hacker reappears in these kinds of projects. This reflects how only a few of the senses are being relied upon, while informatic ways of thinking about life, nature and the body emerge. For example, a simple headset with sensors could turn your brainwaves into different sounds and colours representing various

aspects of mental activity. This is the so-called neuro-hack project. Similarly, many other meanings can be directly connected to the enormous amounts of information about genes, proteins, cells and so on produced by scientific research. To visualize the behaviour of complicated interactions of biological entities typically involves the eyes, like reading text or seeing a simulation; there are also ways of listening to sounds, and even music, in relation to its changes in form, shape and position.

The open future

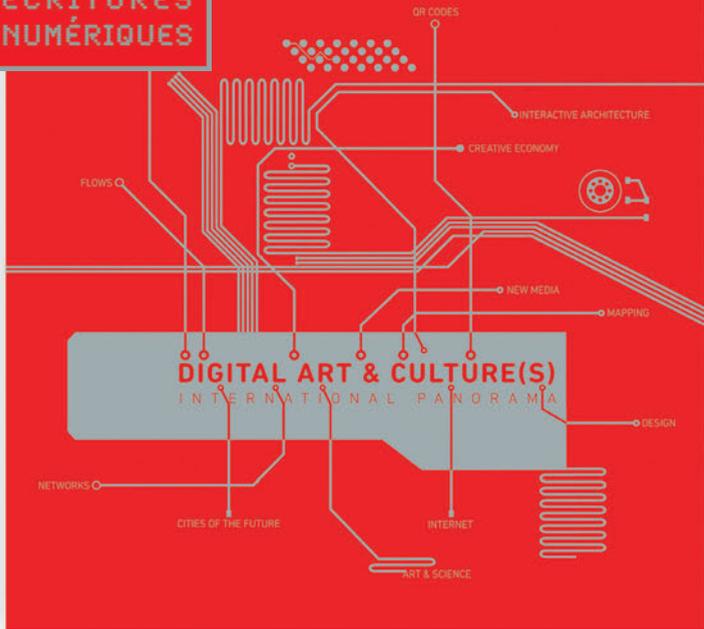
The projects described above might be considered mostly symbolic of the figure of the biohacker and of the laboratory as a social space in opposition to the exclusivity of the life sciences. Similarly, the figure of the biohacker refers to the potential of fledgling groups to become an alternative to the speculative future of life as a technological creation that is imagined to be entirely under control. Of course projects realized by the participants at La Paillasse — or future projects they might be doing in case they managed to upgrade their laboratory — are likely to raise critical and political awareness around issues in biology. For example, their low-cost and low-tech alternatives are “free” as they are performing an operation of (re-)valuing creativity, playfulness and collaboration between amateur-experts of various kinds — especially when compared to the restrictions on the tools’ usage — materials, and knowledge.

Indeed, this kind of combination of technological development, human values, and unrestrained deliberation might be considered urgent and necessary as countermeasures to the ecological risks, insecurities, and life forms that are “out of control” in their association with biotech’s general approach to the modification of plants, bodies and the environment. However, these are values that are not necessarily the opposite of the production and use of scientific knowledge in the life sciences as an increasingly regulated and commercialized activity. The values of access, openness and collaboration are not always exclusive to experiments and research, wherein commercial imperatives have no place. Similarly the desire to scale-up their experiments implies a proximity to the hype and speculation that surrounds the solutions provided by life scientists to the shortage of food and medicine; the speculation regarding the rise of ecological catastrophes of various kinds, and the many different dystopian associations that are its mirror image.

The figure of the biohacker encountered at La Paillasse is refreshing in its aspiration to find another kind of development to emerge out of the intersection between computer science and (molecular) biology. What remains, however, is a balancing act involving this figure’s relationship to the political-activist overtones of the term biohacker. What happens when the scaling up of biohacking projects and the inclusion of more sophisticated instruments — that would give them many more possibilities to act on, and interact with life forms — occur? Obviously there is a tension between the figure of the biohacker, the reliance on more and different types of resources and regulations, and the formation of an open network that would support a new kind of research, collaborations, grants, policy-making, etc. A research agenda that refuses to go this route might end-up becoming alienated from the way things are done in the life sciences. The two sides the biohacker and those doing biology-themselves will come back together at some point in the near future, having matured and having accumulated much more experience. Hopefully, this will be a future encounter that will include the prospect of turning laboratories into social spaces, where there is freedom for anyone to work with DNA in its various formats. ■

Eric Deibel

La Paillasse is located at 6 Rue Léon
Geffroy in Vitry-sur-Seine, where
biohackers meet every thursday.
Web: www.lapaillasse.org



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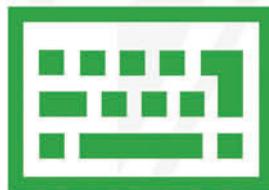


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