



FUTURE
MIRRORS

FUTURE MIRRORS



INTRO

Nearly everybody who looks ahead as it were, is in effect looking in the rear-view mirror, and if people try to prophesize about today's show, they will be steadfastly looking in the rear-view mirror.

— Marshall McLuhan

Since antiquity humankind has tried to domesticate uncertainty by embodying it in a topos or extrapolating it into known systems of belief. In this manner, futurity is envisioned as a coherent superstructure without really giving serious afterthought to the exact nature of its components, and how these came into existence.

Our aim for *Future Mirrors* was to invite different specialists who, due to their research and experience, might offer an interesting, even provocative, vision of their own discipline's future. Modelab's intention was to use these thoughts and proposals as a departure point for our theory, indeed a very playful challenge: If archaeology is capable of inferring the ecological context, beliefs and social and political structure of a civilization from only scraps of what they produced—maybe traces of an irrigation channel, a shard of pottery, fragments of public monuments or even vestiges of a lost language—, might it be possible to make similar inferences taking instead of concrete remains only propositions of what that society might be?

We thought of this approach as a sort of prospective archaeology, and with this in mind we set out to ask our collaborators—artists, designers, philosophers and scientists—to imagine a particular object, a thought, a system or even a mere reflection on their own vision of the future. Would that object be useful? How could its performance be measured? If an idea, who would embrace it and for what purpose? To what degree should current laws or cultural norms and beliefs be breached to permit its existence?

This dialogue proved to be fruitful, but not without surprises. Our original proposal, intentionally vague, surreptitiously provocative, drifted in and out of the different fields of knowledge of our collaborators. And in this process, as happens with any attempt to tie down the ever changing notion of what the future may be—a true promethean effort—, we ascertained that ideas about destiny are more a desire and reflection of ourselves than a path to be followed.

The premise of the prospective archaeology exercise endured the test of collectivity. Applying this method to scattered and even dissimilar fragments of a possible scenario brought forth interesting notions. First and foremost, the fact that whatever the future might be, it will be remarkably atomized. If diversity and antagonism between individuals is the key for biological growth and evolution, it is also clear that not one future, but hundreds await us. But this is not new, as in our time, different segments of the present and even aspects that are considered futuristic exclude or include large sections of the population depending on wealth, geography, knowledge and a myriad of other subtle markers such as gender or age.

Another interesting idea was that almost in every case the future envisioned depends on technology for it to come to pass. This fact is somewhat in opposition to, for example, the first future blueprint of the Renaissance, Thomas More's *Utopia* (1516), in which theoretical speculation is more relevant than technology or its artefacts. It is nevertheless congruent with the blind faith in technology of our times, fuelled by Moore's law and certainly encouraged by the absence of major intellectual discourse beyond what market-driven economies and governments (liberal or authoritarian) have been dictating since the end of the Cold War.

Vivette García Deister and Michael J. Montoya's provocative piece speaks of the inherent doubt that any technology can be a positive force, pointing out the undeniable fact that mastering life and its arcane biology might be a rather perilous venture, amounting to little more than a dangerous vanity.

In the same manner, but this time through a comprehensive interweaving of biology, art and the economy, Raph Kim welcomes the aesthetics of uncertainty. Given the current state of the world economy, organized in an obscure fashion and already out of control and beyond human comprehension (vid. high-frequency trading, volatility, systemic risks, etc.), and on the other hand experimental biology (unleashed in countries without strict legislation or supervision), Kim's proposal provokes as it becomes more a blueprint than mere speculation.

Also, in Luis Ortiz-Catedral's *Digital Conservationism*, the use of technology appears as both solution and memorial to species' extinction. Ortiz-Catedral rightly underlines the fact that what we achieve, or store, today, could be reinterpreted in a myriad of ways later in the course of history. Inherent to any speculation or given technology, human character, unpredictability or foolishness creep along steadily and in full view.

But visibility is also a matter of confrontation and engagement, as Nina Valkanova proposes with the amalgamation of the environment, public spaces and civic participation. Suggesting that modern metropolis malaises could be addressed and publicly visualized, Valkanova's proposal brings meaningful communication and interaction between rulers and ruled to the fore as tools to model a more efficient society.

Not necessarily in opposition but rather as a complement, Ryuta Nakajima's vision implies that not everyone will accept openness and visibility, and some technologies will enhance camouflage and deception. Rejecting the binary structure of current social networks (like it or not), *Derma Modifying Interface* appeals with some humour to a very real possibility: that of sharing more than our opinions and views over the Internet using our bodies and minds as canvases for other people to reach.

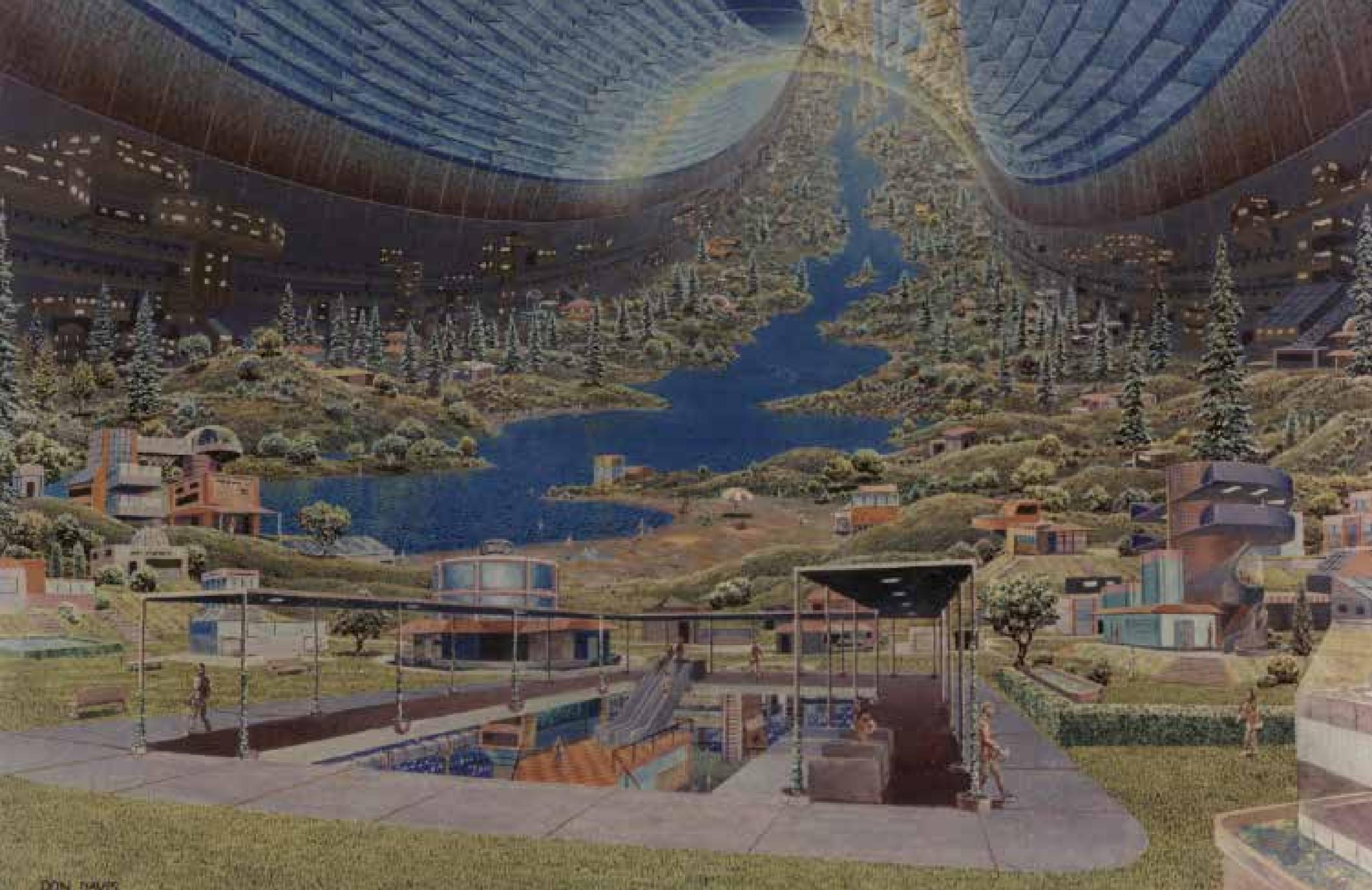
And what would happen if these same networks, instead of feeding humankind's petty narcissism, could organize to channel a "collective unconscious of accumulated discontent"? Geert Lovink and Ned Rossiter

assert a unique scenario in development by which society can rise above "slacktivism".

Finally, in his short and concise review of physics history, Miguel Alcubierre suggests to "come to full circle" with one daring proposal in which technology plays indeed a very minor role. Instead, rather disruptive tools (to mimic the vociferous elán of our time) should come into play: abstraction, synthesis, and pure thought.

So it is that Modelab's survey and original hypothesis comes to an end. Prospective archaeology is indeed possible, if by this we understand a ludic manner to confront our hopes and fears, assuming that as a civilization we have been granted the privilege of perpetual survival. This, of course, is still to be seen.

MODELAB



A NOVEL ARGAN

Our world is increasingly being populated by a novel form of Argan — Molière’s *Le malade imaginaire* — one who “walks, sleeps, eats, and drinks, like other folks, but that does not hinder him from being very ill” —in the future. He is neither a hypochondriac nor an invalid, but an asymptomatic (future) patient whose very personal propensity to suffer certain maladies is being read off a diagnostic chip. He also goes by the name of perpetual patient, prospective patient, pre-patient, and potential patient. Shall we call him Fortunato for short?

This novel Argan has been individually subjectified as being at risk. He is as much imagined as he is statistically inferred by zealous biomedics on the quest for domesticating uncertainty by calculating global hazards. But he is not alone. Often accompanied by other strains of the worried well, he can be seen negotiating his existence across all levels of the stratified risk society.¹ In one strata position he may be voluntarily liaising with similarly identified others, forming the new collective subjectivities that we have come to associate with the terms ‘biosociality’² and ‘biological citizenship’³. In another, less auspicious strata position, he might be involuntarily made-up by policy makers and public health practitioners as a member of a class afflicted by risk, and thus, subject to intervention.

Sickness ahead. This probability statement is the democratic slogan with which all breeds of the also emergent forms of health care visionaries, from boutique genomic counselors to bioeconomic global leaders, are extending the powers of the Biomedical TechnoService Complex, Inc.⁴ The technologies of foresight used to arrive at this motto bring forth an existence that is out of joint, for the moral obligation to remain healthy today is based on knowledge of the risk of being diseased (or prematurely deceased?) in the future.

The mothers-to-be who are monitored for every microdose of potential pathogen or developmental bioindicator are screened from prebirth. Alpha fetal proteins

long ago gave way to full biomic screens at resolutions unfathomably ‘accurate’ across time and space. Their daughters’ daughters are now the protectorate of the state. Workers of all kinds, and the professions, precreen applicants for susceptibilities and traits best suited to either endure the pathogens or be pressed into biocognitive service to employers.

Historical popular ‘fictions’ like *The Handmaidens Tale* or GATTACA miss the mark by miles and decades. The former presumed that only women would be subjected to the needs of the bioindustrial complex, the latter that the only protections against discovery of biosocial identification were performative and biohygienic. In this world, the Argan Fortunato, is always already prefigured through algori-logics that are as robust as the epistemological frameworks that enable their reproduction.

Yet, in the midst of this dystopic enslavement, the bios and the socios push back. Never has the bioindustrial complex completed its task of full enclosure of life itself. Strangely, beautifully, in the hot messiness of the indigestion that is the socio-biomic soup of being itself, emerge irruptions. Everywhere and always uncontrollably rapturous these irruptions are unruly, spontaneous, yet patterned. Just as rhythms help shape the movements of bodies in dance and trance, the demos shakes in terror, for the implications are clear. Freedoms assault the securitized statehoods that perpetuate a lifeworld near perfectly suited for the extraction of bio-surplus from those dead and those not yet born.

The ‘more onerous citizenship’⁵ of illness is now celebrated in rituals of Argan *liberté, égalité, fraternité*. For the asymptomatic Argan is also seen, between the cracks, as a symbol of domination par excellence. Fortunato, from whence does your freedom come?

VGD & MM

- 1 Beck, U. 1992. *Risk Society: Towards a New Modernity*. Sage.
- 2 Rabinow, P. 1996. *Artificiality and Enlightenment: From Sociobiology to Biosociality*.
- 3 Rose, N. 2006. *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century*. Princeton University Press.
- 4 Clarke, A et al (eds). 2010. *Biomedicalization: Technoscience, Health and Illness in the U. S.* Duke University Press.
- 5 Sontag, S. 1978. *Illness as Metaphor*. Farrar, Straus & Giroux.



Fungal Indices

In the last years I have been working as 'biohacker-designer', exploring the social, cultural and political implications of biotechnology. I strive to create possible future relationships between humans and micro-organisms, articulated through hands-on biological experimentation, story telling, and making.

For a recent project called *Fungal Indices* (2014), I entertained the idea of using micro-organisms as living 'financial models', that could inform us of the state of our economy. We are no stranger to the notion of finding germs on hard cash: Banknotes and coins being a breeding ground for plethora of micro-fauna, accumulated and exchanged through financial transactions. But could microbes themselves, a biological symbol of our environmental health, also become an ambassador of our economic health?

Using a species of live *Penicillium* mould as the raw material, I designed and 'grew' sculptures out of them. I started to speculate how micro-organisms could produce meaningful shapes and patterns that could be interpreted. Several variations of such sculptures were created which sought to reflect the financial turmoil at the time of an economic crisis. The nutrient agar framework on which *Penicillium* moulds grew had been modeled on actual fluctuating values of the stock market. Over time, the frameworks allowed biological process of growth to take most of the control in shaping how the sculptures looked.

Speculating Our Futures

In popular literature and cinema, the future is often imposed on us, depicted as a set form, accompanied with aesthetic cliché. But as designers, we do not necessarily have to use design to predict the future per se, nor make pronouncements about 'the future'. Instead, we can speculate: Using the future and design as a space to create new kinds of conversations, allowing ourselves to shape the actual future. It is a powerful approach that provides designers and artists the license to dream, ponder and indulge in what the future may hold.

Fungal Indices project is an example of design that explores application of micro-organisms, who are the current workhorses of biotechnology

and emerging synthetic biology – in the context outside of the traditional industries such as food, medicine and sustainability. It is also a project that uses power of speculation to imagine a microbial future implicated in the financial industry: How would the fungal sculptures look like, who would use them, and how could they shape the financial industry?

'Dry' and 'Wet' Speculations

Traditionally, designers speculate future scenarios in a 'dry' format, that are made using somewhat conventional materials such as wood, plastic, metal and so forth. But now, with the emergence of the DIY movement, and increasing accessibility and openness of technology, designers have an opportunity to use the tools and materials of biotechnology hands-on, to explore our biologically-enhanced futures in an unprecedented way.

Refashioning the notion of 'thinking through making' into 'thinking through growing', and fully embracing the aesthetics of uncertainty, the sculptures in *Fungal Indices* aimed to incorporate the unpredictable and organic nature of biological processes to take to the fore of the design process. It is a somewhat critical stance, aiming to undermine the implicit claims of traditional design as stable, permanent, and self-sufficient.

Using nature, including micro-organisms, as part of the design process brings spontaneity and risk, but also new meanings and richer narratives. Since microbial life harvested and manipulated from a given environment represent a sort of a biological timestamp – an organic map of its history –, culture, society, and more artists and designers, have an unprecedented yet exciting ways of expression and communication.

RK

Image Captions

1. *Tail Risk* (2014), 3D agar framework, paper, Penicillium mould.
2. *Dayrate Volatility* (2014), 3D agar framework, paper, Penicillium mould.
3. *False Market* (2014), 3D agar framework, paper, Penicillium mould.



Digital Conservationism

Studying endangered bird species in their natural habitat is part of my identity. It is both what I do as part of my job and also the thing I am most passionate about. When I was a kid, I watched “Lorne Greene’s New Wilderness” religiously. “Lorne Green’s...” was a Canadian Nature documentary show, which beautifully revealed intimate aspects of the lives of many animals. It was both inspiring and educational. After each episode I always wondered which adventures was Mr. Greene’s planning. Little I knew he had died years before I had seen the first episode. This caused a profound impression in me. A man, whose show changed me, was long gone, yet his work continued moving people around the world. Nowadays it is not necessary to be a TV presenter to make use of modern technology and contribute to a global exchange of wildlife footage and files. Part of a realm that until recently belonged to documentary-makers and scientists has opened up to almost everybody. I firmly believe that this opens up a new arena for a more complex engagement with nature that has not been fully explored.

On a recent visit to the Galapagos Islands I realized something: visitors to these islands and most likely to all sorts of places, experience the place, and its species via their smartphones. We travel thousands of miles to come in contact with a unique array of species and habitats, yet, at our fingertips, we have the possibility of sharing with our loved ones as well as strangers, images and videos of whatever species we encountered almost instantly. We can relate to these species in ways that are impossible via technical publications, or even nature documentaries. Hopefully we can reach more efficiently to others and make them aware of the conservation needs of many species as well as the multiple emotions they entice in us. We can now simultaneously, observe and share an amateur, unscripted footage of a shark swimming, a carefully crafted documentary describing the biology of the same species and an opportunistic footage of illegal shark finning. Viewers can venture down a multitude of emotional paths on an ever-expanding media landscape. There is an incredible and unprecedented potential to create a virtual space where people can relate, learn and share encounters with wildlife, whether deliberate or accidental with living people as well as future selves. We can combine our genuine curiosity about the life of a species or put an artistic or humorous spin to

our footage to craft an experience that is no longer restrained by the script of a nature documentary or the traditional copyright boundaries. Such potentially rich exchange will be about species living nowadays but that will undoubtedly disappear within our lifetimes, as well as long-gone taxa (for instance, the 1933 footage of Tasmanian tigers).

If we cannot save a species, we can, at the very least ensure that a rich reservoir or images, video, audio and user-generated materials persists. Clearly this idea about a future reservoir or library of wildlife audio, video or images media isn’t new. There is the ambitious, *Encyclopedia of Life* (eol.org), there is also *Arkive* (arkive.org) as well as *xeno-canto* (xeno-canto.org) to name three of the most widely known spaces. But I think the experience can go much further, and I think fellow scientists and I have a responsibility to contribute from our respective areas to create a virtual biosphere. The study and enjoyment of birds and other animals in the wild can be seen as a selfish activity. Enjoying and studying any creature in a digital space can be a multi-generational, active and collective venture. There is clearly a tragic backdrop to this idea: as rich and stimulating such a task might seem it will represent an account of our present inability to safeguard species and habitats. In the same way fossils once helped scientists understand mass extinctions, a virtual biosphere will be the testimony of the biological richness that we, collectively chose not to preserve.

I believe that when a species or habitat is lost forever, humankind loses part of its core. Ideally, in the future, we could have both, the real and virtual biospheres with all their components. Since we simply cannot, the closest thing to damage control follows, not as a substitute, but as a complement. While studying and trying to conserve species, it is also possible to produce much needed digital material.

How will people relate to extinct species that still “live” in a digital space? Since the species and most likely their habitats will be long gone, would preserving the files become the major conservation concern? Would computer virus represent the looming threat? What about the notion of copyright? Will the footage of particularly rare species become a trophy just as centuries ago the animal itself was the trophy? What about cyber-traffic of precious material? Will a rich, but necessarily tragic digital account of species and habitat disappearance finally persuade people to engage in a morally responsible discourse about nature globally? Will human-driven species extinctions continue? Will future naturalists explore the personality of the author of a given video based on properties of the video itself? As I ponder these questions, I see a group of birds outside my window and reach almost instinctively for my smartphone.

LOC

The Public Visualization of Citizen Data



The constant development of computing has enabled the expanded integration of computational, sensing and display technologies into everyday public settings and lifestyles beyond the workplace, including the spaces where we meet, study, play and relax. Driven by the increasing availability of data, together with the rising affordability of sensors and - the now ubiquitous - use of mobile communication devices, urban computing (ubicomp) aims to instrument the human experience of public space with digital information. Consequently, the ability to measure, monitor and track the digital traces people leave as they go about their daily lives has turned into true capital for an increasing number of urban stakeholders [Townsend, 2010].

However, there is still an enormous gap between the promises of effortless and informed living and the accomplishments of ubicomp research: "we simply don't do smart very well yet" [Greenfield, 2010]. One of the underlying problems is that ubiquitous systems require models of human behavior based on rationality and predictability. Yet, people often behave in unpredictable and subtle ways in their everyday contexts, and their public life constitutes a much wider range of emotions and experiences [Paulos and Beckmann, 2006]. Instead of using computational technology to reduce the need for humans to think for themselves [Rogers, 2006], can technologies be designed to augment the human intellect as to support curiosity, insight, and meaningful action?

This alternative take on ubicomp points to a perspective on the acquisition and visualization of urban data in engaging and insightful ways. The public urban space can be utilized as the context for collecting citizen data, staging public visualization installations, and studying their impact 'in-the-wild'. The combination of data visualization as a means to represent citizen data in attractive and insightful ways, with ubiquitous technologies for displaying, sensing and interacting, could potentially make us more informed and engaged citizens.

A pivotal role in this approach play a new understanding of the use of the public media landscape - still predominantly commercially motivated digital imagery. A number of cultural and artistic studies have started to question this status quo by exploring new concepts, methodologies and experiments to uncover the potential of media architecture as mediator for the social encounter between citizens [Struppek, 2008], the construction of

reflection and collective memory [Broeckmann, 2009], or the influence on consciousness and behavior [Bounegru, 2009].

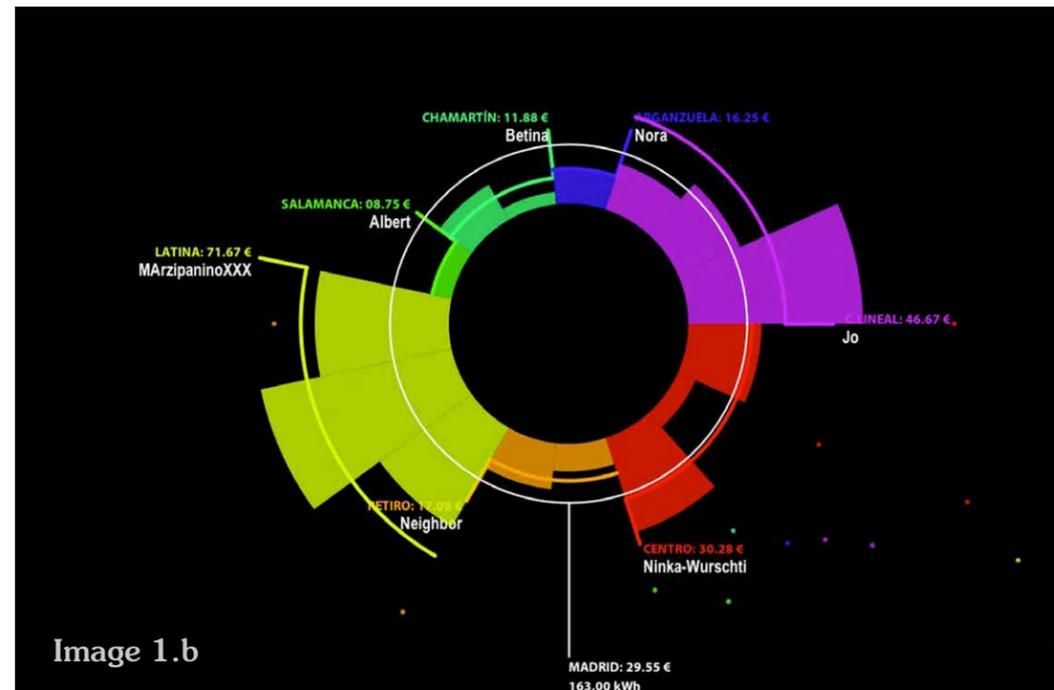
Accordingly, exploring their particular characteristics such as the explicit public dimension, visual presence and opportunistic accessibility, urban screens and media architecture can be used as medium for the visualization of contextually relevant citizen data in public space, in order to stimulate and influence awareness, reflection and participation.

How can situated technologies be conceived to help sense, acquire and interact with citizen data within real-world physical settings? How can visualization techniques be adapted to personally meaningful data sources, to the social groups people play and live, and to public spaces they share?

Designing for the Social Visualization of Citizen Data

Reveal-it! [Valkanova et al, 2013] envisions the idea of revealing on-site data about the citizens' energy consumption in urban communities. The public display visualizes interactive graphics, based on the data, both downloaded from public databases and collaboratively gathered. Sharing happens via a mobile web form (accessible through a QRcode if you are on the street). Thus





any onlooker or passer-by can voluntarily input their data into the system via a mobile interface - one has to enter her monthly energy expense (what she remembers to have paid for her last electricity bill), her neighborhood and the number of co-inhabitants in her household. The energy data reported by an individual person is then represented as a sunburst (*Image 1 a & b*) in the interactive visualization. Each neighborhood is represented by a different color, and occupies different parts of the circular shape proportionally to the relative participation rate of the neighborhood. Reveal-it! has been integrated as a projection into several community and cultural centers in Barcelona, Madrid (Spain) and Cordoba (Argentina).

Another project, *MyPosition* [Valkanova et al, 2014] allows for a novel way of public participation: passers-by get the opportunity to place a vote on local topics by performing body gestures in front of a large public display installation. *MyPosition* (*Image 2*) is an interactive facade, which represents a collective visualization of citizen opinions. Based on an intuitive and funny-to-use body-interface, the reactive visual facade attracts passers-by, who can approach and express their own civic position on a given topic by positioning themselves along the facade. At the same time, the facade displays a playfully visualized collection of opinion 'shades' (from 'totally



disagree', to 'totally agree') of other citizens and thus represents a collective public communication platform, which can serve as a feedback tool between local communities, the media, the city, and beyond. *MyPosition* has been deployed in different social community spaces in Berlin, Germany.

The Smart Citizen Sentiment Dashboard (SCSD) [Behrens et al, 2014] (*Image 3*) is an interactive and participatory installation that lets citizens engage with and compare opinions on urgent challenges in their cities and across connected cities. *SCSD* aims to translate instant citizen feedback facilitated by a custom-made urban interactive device into a visual language, which is displayed in real time on a media facade or urban screen. Large-scale urban visualization can be experienced from different social spots around the site beyond the immediate zone in front of the building, such as the side-walk, the cars, bus-stops or metro entrances. The dashboard installation has been staged at several media facades, including Sao Paulo, Linz, Berlin, and Riga.

The Future of Citizen Driven Data Visualization

Staging the above projects in real-world settings has shown that public and participatory visualizations can invoke a range of behaviors - contemplation,

awareness about the presented data or a range of self-reflections on the context of individual contributions, discussions about data privacy, explicit personal comparisons among peers, and open critical debate on implied community and city-wide issues.

When envisioning public visualization as a vehicle for situated, contextually-meaningful communication, data should reflect the particular values and circumstances of the people, buildings, or activities within the local environment. Civic issues such as air pollution, crime, council expenditures or traffic will also benefit from social public visualization, by contextualizing relevant data, originating from governmental organizations (e.g. open data archives in the public sphere). In addition, public visualization could be complemented with other citizen-driven forms of data collection and sharing by interfacing participatory sensing kits and services (e.g. Smart Citizen Kit).

Combining situated means for visualization, with both top-down and crowd-sourced platforms will potentially contribute to an integrated public ecology of interfaces for social or political communication and constructive feedback among urban stakeholders: citizens, urban hackers, governmental and advocacy groups, and the media. Yet, how critical notions such as transparency, plurality, contingency and empowerment [Dörk et al., 2013] will be defined and negotiated in a public participatory context will be an open issue as well as how people's own contribution will be effectively influenced when others' are readily visible.

NV

[Greenfield, 2010] Greenfield, A. (2010). *Everyware: The Dawning Age of Ubiquitous Computing. New Riders.*

[Rogers, 2006] Rogers, Y. (2006). *Moving on From Weisers Vision of Calm Computing: Engaging Ubicomp Experiences.* In *Proceedings of the ACM International Conference on Ubiquitous Computing, Ubicomp'06*, pages 404-421. ACM.

[Paulos and Beckmann, 2006] Paulos, E. and Beckmann, C. (2006). *Sashay: Designing for Wonderment.* In *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, CHI'06*, pages 881-884. ACM.

[Behrens et al., 2014] Behrens, M., Valkanova, N., Fatah gen Schieck, A., and Brumby, D. (2014). *Smart Citizen Sentiment Dashboard: A Case Study Into Media Architectural Interfaces.* In *Proceedings of The International Symposium on Pervasive Displays, PerDis'14.* ACM.

Valkanova, N., Jorda, S., Tomitsch, M., and Vande Moere, A. (2013). *Reveal-it!: The Impact of a Social Visualization Projection on Public Awareness and Discourse.* In *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, CHI'13*, pages 3461-3470. ACM.

Valkanova, N., Walter, R., Müller, J., and Vande Moere, A. (2014). *MyPosition: Sparking Civic Discourse by a Public Interactive Poll Visualization.* In *Proceedings of the ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW'14.*

Mirjam Struppek (2006): 'Urban Screens - The Urbane Potential of Public Screens for Interaction' in: *intelligent agent* Vol. 6 No. 2, *Special Issue: Papers presented at the ISEA2006 Symposium*, August 2006.

[Greenfield, 2010] Greenfield, A. (2010). *Everyware: The Dawning Age of Ubiquitous Computing. New Riders.*

[Townsend et al., 2010] Townsend, A., Maguire, R., Liebhold, M., and Crawford, M. (2010). *2020 Forecast: The Future of Cities, Information and Inclusion.* Technical report, Rockefeller Foundation, Institute for the Future. <http://www.rockefellerfoundation.org/uploads/files/814a5087-542c-4353-9619-60ff913b4589-sr.pdf>.

[Broeckmann, 2009] Broeckmann, A. (2009). *Intimate Publics: Memory, Performance, and Spectacle in Urban Environments.* Urban Screens Reader, Amsterdam: Institute of Network Cultures, pages 109-118.

[Bounegru, 2009] Bounegru, L. (2009). *Interactive Media Artworks for Public Space: The Potential of Art to Influence Consciousness and Behaviour in Relation to Public Spaces.* Urban Screens Reader, pages 199-216.

[Dörk et al., 2013] Dörk, M., Feng, P., Collins, C., and Carpendale, S. (2013). *Critical InfoVis: Exploring the Politics of Visualization.* In *Extended Abstracts of the ACM SIGCHI Conference on Human Factors in Computing Systems, CHI'13*, pages 2189-2198. ACM.

SEPIA PHARAONIS: CHROMATIC COMPONENT CHART



DERMA MODIFYING INTERFACE

Derma Modifying Interface is an artificial skin modeled after cephalopod which functions as a bridge between individual and its environment. This suit is a neurally controlled multi-layered artificial skin that allows instant changes in both color and texture, which enhances aesthetic, agonistic, emotional and protective human behavior. An average adult has about 2 m² of body surface area that can be utilized as a transmitter of visual information. This, in turn, will transform our body into faster and more accurate visual interface that ultimately changes the way we interact with other members of society and the external world around us.

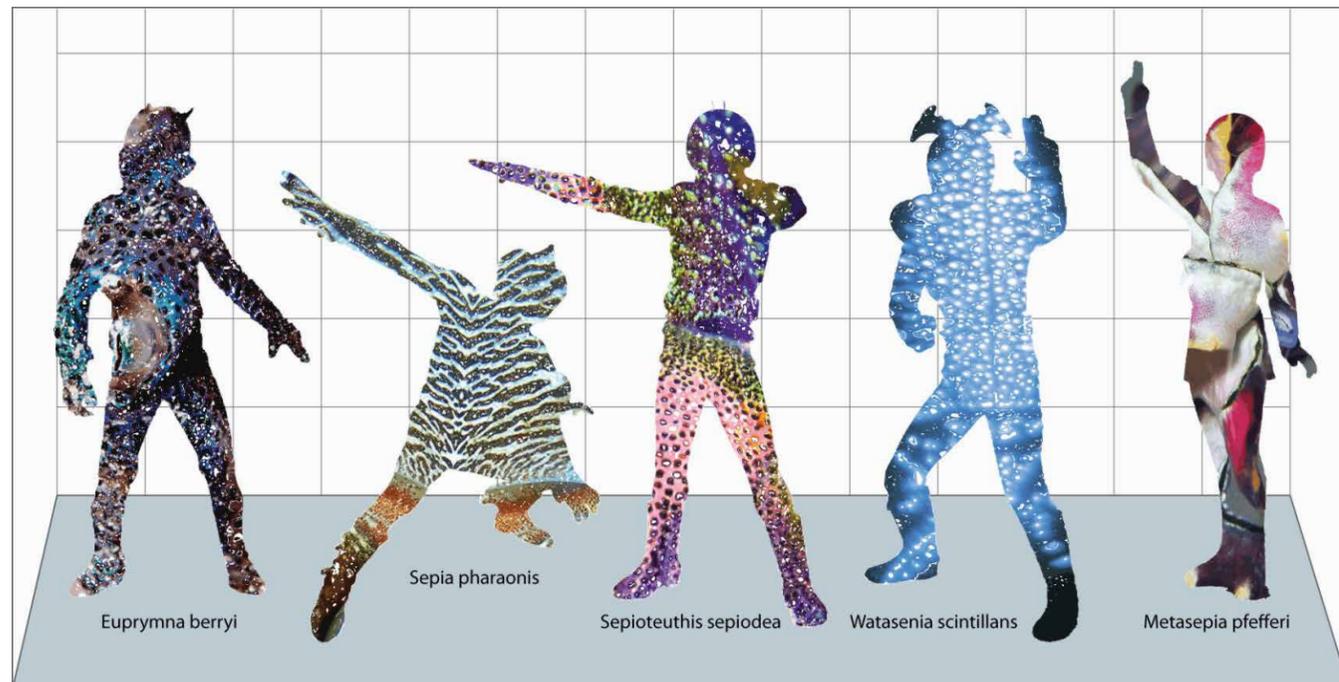
For decades, material scientists, bio-inspired engineers and military industries have been attempting to create a system that allows human and/or machines to have cephalopod like abilities to camouflage. Cephalopod, such as cuttlefish, squid and octopus, has an unmatched ability to rapidly change its body color, pattern and texture to match its environment and to communicate with each other. They achieve this unique ability to create wide varieties of chromatic components by neurally controlling millions of multi-layered pigmented cells called chromatophores which expand and contract to optically mix colors. This system is very similar to Pointillism of Geroges Seurat and, more recently, pixels in computer graphics. In fact, a cuttlefish body pattern resolution is at around 350dpi. In addition to chromatophores, there is another layer of reflective cells

called iridophores which add additional color rage by regulating light reflectivity and papillae which adds three-dimensional texture. Combining these physiological characteristics, cephalopods are able not only to match visually complex environmental conditions but also able to communicate by manipulating codified visual information.

Much like cephalopods, visual information plays an important role in our spatial navigation, intera and interspecies communication, protection, reproduction and aggression. The relational dynamics between an individual and its' environment greatly depends on reception and interpretation of visual information. The information gathered through eyes is processed into expansive possibilities of phenomenon which is, then, simplified and fused into quickly digestible codified symbols for a rapid outward reaction. In short, the visual system is designed in the course of evolution to isolate and extract vital information and matching it to preexisting set of triggers for an accurate situation assessment. Despite the technological advancement which has been pushing the graphics towards hyperrealism, what the brain desires is Packman like codified simplicity.

Recent development of social network systems has drastically transformed human interaction and communication both in terms method and content. SNS like Facebook has drastically reduced complex human interaction to binary code. In relationship to the complexity of one's empirical and mediated experiences, which include both macro (sociopolitical situations) and micro (personal day to day thoughts and events) social dynamics, all potential reactions are encompasses into either to "like" (includes like and dislike) or to ignore (do nothing). This seemingly oversimplified system not only well represents our brain function that manages simplified codes, but also shows critical and fundamental behavioral strategy that many species of animals use to interact with the environment. For any given external input, an animal needs to actively and rapidly decide to act or not to act. Then the individual choses appropriate action as a secondary choice such as attack, escape, defend, eat, mate, etc. Although the current binary system is working sufficiently, the future generation of digitized social system will include the secondary behavioral choices and will reduce its physical dependence on mechanical devices.





FUTURE CAMOUFLAGE SYSTEM BASED ON CEPHALOPOD BODY PATTERN MECHANISMS

Considering these various factors, DMI which allows visual and textual metamorphosis will initially be developed for a military application to achieve next generation camouflage. This camouflage allows soldiers and machines to match their surrounding thereby creating invisible and undetectable visual stealth. The technology and materials will then be brought down to consumer level applications ranging from fashion to communication. With combination of faster CPU and neurological and physiological bio-interface, this system will further enhance how we connect and interact through rapidly changing complex visual patterns which are socially codes for specific internal changes. By maximizing the potential of 2m² of body surface area, we will be able to weave anything from data driven raw information, socio-political viewpoints, emotional and psychological state and much more information which are already at public domain through SNS. DMI will ultimately change our consciousness by bringing both biological and cultural information to be accessible at empirical sphere.

RN



Concentrate your Power: Design Organized Networks

"7,136,376 people like this. Sign up to see what your friends like." Facebook

"I want to return to a world without recommendation algorithms." Jenny Schaffer (VICE)

There is a scenario that can influence the work and lives of billions. It is a simple reversion of the dominant social media logic of monopolies such as Facebook, Twitter and Google. Instead of growing networks through 'weak ties' users concentrate their efforts on small groups in order to get things done: a collective move from communication to social action from weak ties to strong links. So far, network gurus have only looked to the ever-growing imaginary outside. Software and algorithms want us to expand our market share in the 'link economy'. But what's the use of endlessly maintaining the network of 500+ 'friends', ending up 'working for the timeline'? With all the pictures we upload and status updates we only signal that we're still in the rat race: look at me, I am still alive.

We should start sabotaging the pressure to update and grow our networks and short-cut the implicit competition amongst us. The proposal here is to intensify what's already there and start collaborate instead of merely communicate our existence. Organized networks, also called orgnets, is first and foremost an unidentified theoretical object. Read it as a proposal to undermine the fear of missing out. The concept is an amalgamation of 'organization' and 'network' and was developed by the authors in 2005 in response to the rise of the 'social networking' paradigm and traditional ideas in management circles about the 'networked organization'. The term can be read as a variation, and upgrade, of the popular 'organized crime' and the more imaginative but slightly conceptual term 'organized innocence' (as described by Adilkno in their book *Media Archive* from 1998). Needless to say, orgnets are both virtual and real. They are as much living data, hoovering on harddisks, as they are hardcore urban tribes, non-identities, invisible for non-members.

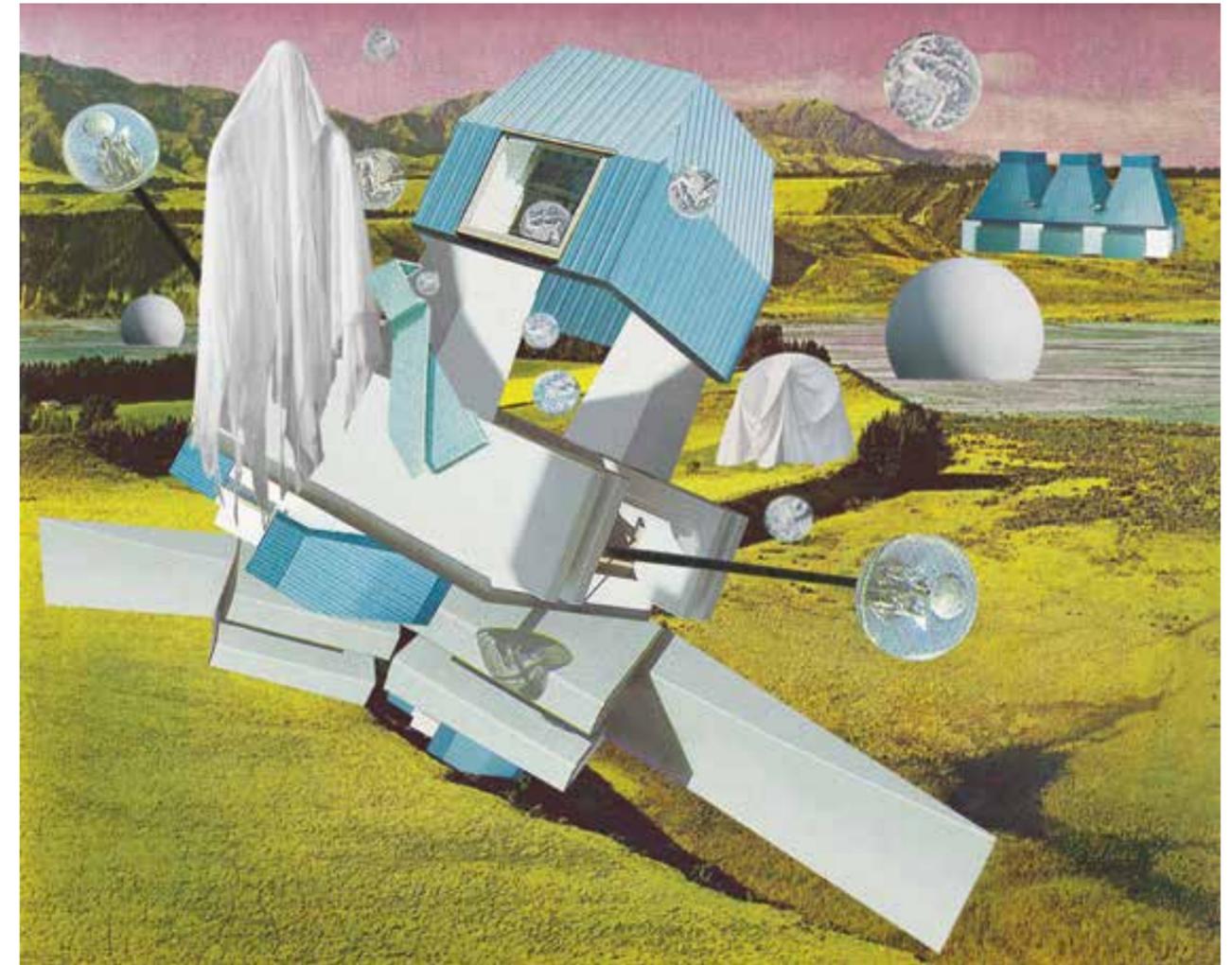
Orgnets have grown in response to European offline romanticism and assembly strategies from Occupy activists. Meeting in-real-life is cute but expensive and often impossible to arrange on the short run. Most collaborations these days are anyway not touristic in nature. There is a tragic, harsh element in the fact that we're more often than not in the same room, building, city or continent. This is the rotten reality of our global existence. Organized networks may already exist but should still be read as a proposal. This is why we emphasize the design element. Please come on board to define what orgnets could be all about. The concept is an open invitation to rethink how we structure our social lives.

Whereas it is possible to interpret the rich history of humankind as orgnets, from clans and villages to secret

societies, collectives and smart mobs, the authors prefer to emphasize the 21st century blend of technology and the social. Orgnets have appeared on the scene in response to the crisis of conventional organization such as the trade union, the political party, the church and the social movement. The informal networks that unzip the tweets and create events are the real forces behind the growing list of 'global uprisings', from M15 in Spain, Gezi Park in Istanbul to Hong Kong. Today's revolts no longer result from extensive organisational preparations in the background, neither do they produce new networks of 'long ties'. They do, however, often emerge from a collective unconscious of accumulated discontent.

Networks are not goals in themselves and are made subordinate to the organisational purpose. Internet and smart-phone based communication was once new and exciting. This caused some distraction but that's soon going to be over. Distraction itself is becoming boring. The positive side of networks - in comparison to the group - remains its open architecture. However, what networks need to 'learn' is how to split-off or 'fork' once they start getting too big. At this point networks typically enter the danger-zone of losing focus. Intelligent software can assist us to dissolve connections, close conversations and delete groups once their task is over. We should never be afraid to end the party—and announce the next one.

GL & NR



KAL, *Soft Signals* (2011)



Space, time
and the
Universe.

Over two thousand years ago Euclid established the basic rules of geometry, which is in essence the study of the properties of the 3-dimensional space of everyday experience. At that time, geometry was separate from what we would now call physics, that is, the properties of material objects. In fact, it was believed that the rules that govern the Earth were very different from the rules that govern the heavens. Geometry had much to say about the motions of the Sun, the Moon and the planets, and it was even used by Aristarchus to deduce that the Sun was much further away than the Moon, and by Eratosthenes to measure the size of the Earth. Even much later, with the scientific revolution of the seventeenth century, geometry and the properties of space remained as a branch of mathematics, providing just a stage where all physical phenomena took place.

This picture started to change in the nineteenth century when mathematicians like Gauss, Lobachevsky and Riemann showed that the geometry of Euclid was not unique. The study of the so-called non-euclidean geometries opened up the possibility of imagining multi-dimensional curved spaces. Riemann himself speculated about the possibility of our physical 3-dimensional space being curved. It was, however Albert Einstein in the early twentieth century who finally made use of these non-euclidean geometries in physics. In his theory of General Relativity, he describes the force of gravity as nothing more than the effects of the curvature of a four-dimensional space-time, where ordinary space can be distorted, and where time can flow at different rates depending of where we are. This theory gave us for the first time the possibility of understanding the basic properties of space and time themselves.

General Relativity is a beautiful and elegant theory. It allows us to study the motions of the planets with exquisite accuracy, and predicts the existence of exotic objects like neutron stars and black holes, of waves of space and time that propagate at the speed of light, and even allows us to study the evolution of the expanding Universe as a whole. But for all its glory, General Relativity cannot be the final theory. Almost at the same time as relativity was developed, other researchers started to unravel the laws that govern the atoms and their constituents. Scientists such as Planck, Bohr, Heisenberg, de Broglie, Schrödinger and Dirac developed a new theory of the physics of the very small, a theory that looked very

different from our everyday world. This new theory, called Quantum Mechanics, showed that energy comes in small packages, called “quanta”, and pointed to the existence of a discrete, discontinuous character of nature. Quantum Mechanics and its further developments have allowed us to understand not just the structure of atoms themselves, but also of nuclei, and the properties of elementary particles such as protons, neutrons and electrons. It has allowed us to predict the existence of new particles and forces, and even to begin to understand the origin of mass. It has also indicated that space is full of “virtual” particles and energy continually popping in and out of existence.

In General Relativity and Quantum Mechanics we have the two glorious pillars of modern physics. But all is not well, our two great theories, General Relativity that describes gravity, space, time and the grand scale structure of the Universe, and Quantum Mechanics that explains the extremely small world of elementary particles, can be shown to be mathematically incompatible. Something has to give. For over 50 years the brightest physicists have tried to unify both theories, seeking a quantum theory of gravity that can replace General Relativity. One possible path, called string theory, assumes that elementary particles such as the electron are not points but rather tiny vibrating strings, with a size a billionth billionth times that of the proton. But for mathematical consistency such tiny strings must live not in three, but rather in nine dimensions of space. But if we have nine dimensions why do only see three? Perhaps the extra dimensions are curled up in small sizes not much larger than the strings themselves. String theory is certainly beautiful and sexy, but it has yet to give a single physical prediction that can be tested experimentally, and it is full of complex and yet unsolved mathematical problems. It is also not the only game in town. There are other avenues of research, perhaps less well known to the general public, that go by strange names such as “loop quantum gravity”, “non-commutative spaces” and others, that postulate the possibility that space and time are not continuous, but at extremely small scales are grainy, discrete, and that there exists a smallest possible distance and a smallest possible time.

To top it all, the study of the evolution of the Universe, which scientists call “cosmology”, has delivered a couple of surprises. For the last few decades it has

become more and more evident that there is much more mass in the Universe that can be detected by our telescopes. This “missing mass” does not emit light of any kind, and cannot be made of ordinary atoms, since it would imply a very different chemical composition of the Universe than the one we observe. We now call it “dark matter”, and we have no idea of what it could be. And more recently, in the mid-1990s, it was discovered that the expansion of the Universe is not slowing down as our theories would predict, but is in fact accelerating. This can only be understood by the existence of a uniform energy field that produces some form of gravitational repulsion. We call this “dark energy”, and again we have no idea what it can be. Moreover, observations of the early Universe show that together, dark energy and dark matter, make up 96% of all the energy in the Universe, with ordinary atoms, gas, dust, stars and planets making up only the remaining 4%.

So, physics is now at a crossroads, awaiting new theoretical insights, new discoveries at our particle accelerators, new astronomical data, or perhaps all them, to point the way toward a new conception of the Universe. A new synthesis that will unify General Relativity with Quantum Mechanics, and will explain the nature of dark matter and dark energy. When will this happen? It is very difficult to say. If we are lucky, dark matter will be discovered in the next decade in the Large Hadron Collider at CERN. Or some brilliant young physicist will find a way to solve the problems of string theory. On the other hand it can take decades, maybe longer. There is work to be done, a new revolution in physics awaits. And maybe this revolution will change again our understanding of the basic structure of space and time. An exciting possibility is that in the end we might learn that all that exists can be reduced to pure geometry. Abstract, discrete, multi-dimensional geometry to be sure, but geometry nonetheless. And then we will then have come full circle, back to Euclid, and the beginning of our journey of discovery.

MA



BIOGRAPHIES

Miguel Alcubierre was born in Mexico City in 1964. He obtained his Physicist degree from the National University in Mexico (UNAM) in 1988, and a PhD in Physics from the University of Wales in 1994. He later worked for several years as an Adjunct Professor at the Max Planck Institute for Gravitational Physics in Potsdam, Germany. Since 2002 he joined the Nuclear Sciences Institute at UNAM where he is now a Full Professor, and since June 2012 the Director. His research is in the area of numerical relativity, which is concerned with the computational simulation of astrophysical systems using Einstein's theory of general relativity. In this area he has concentrated on the study of sources of gravitational waves, and particularly black hole collisions. He is author of more than 50 publications, as well as a textbook published by Oxford University Press.

Vivette García Deister is a philosopher of science and Associate Professor at the S&TS Lab in the School of Sciences at the National Autonomous University (UNAM) in Mexico City. Her research has examined issues of race, genomics and mestizaje (mixture) in Latin America, as well as the emergence and consolidation of forensic genetics at the intersection of state-based and grass-roots responses to migration and migrant death.

Raph Kim is a biohacker-designer in London, exploring the social, cultural and political implications of biotechnology. In particular, Raph strives to create possible future relationships between human and micro-organisms, articulated through hands-on biological experimentation, story telling, and making.

Kerry Ann Lee is a visual artist, designer and educator from Wellington, New Zealand. The digital montage *Soft Signals* takes inspiration from post-modern architecture, destination advertising and found photographic images of the Waihopai Spy Base sourced from magazines, postcards and

the internet. These deconstructed mutant monuments beg a fresh look at land and settlement through a surreal presence located amidst bucolic, empty landscapes.

Geert Lovink is a media theorist, internet critic and author of *Zero Comments* (2007) and *Networks Without a Cause* (2012). Since 2004 he is researcher in the School for Communication and Media Design at the Amsterdam University of Applied Sciences (HvA) where he is the founding director of the Institute of Network Cultures. His centre recently organized conferences, publications and research networks such as Video Vortex (the politics and aesthetics of online video), Unlike Us (alternatives in social media), Critical Point of View (Wikipedia), Society of the Query (the culture of search), MoneyLab (bitcoins, crowdfunding & internet revenue models) and digital publishing strategies. He is also Professor at the European Graduate School (Saas-Fee) where he supervises PhD students and an Advisory Board member of the Digital Ethnography Research Centre (RMIT, Melbourne).

Michael J. Montoya holds faculty appointments in the departments of Anthropology & Chicano/Latino Studies, in the School of Social Sciences, The Program in Public Health and the Program in Nursing Science in the College of Health Sciences, and is faculty for The Program in Medical Education for the Latin Community (PRIME-LC), in the School of Medicine at the University of California -Irvine. Additionally, Montoya serves as the Director of Research for the Community Engagement Unit of the Institute for Clinical Translational Science in the School of Medicine at UC-Irvine.

Ryuta Nakajima, Master of Fine Art, University of California, San Diego, is a contemporary artist, independent curator, and product designer, who has lived in the Lebanon, Kuwait, Switzerland, Japan and the U.S. His paintings and drawings have been exhibited nationally and internationally. Currently an Associate professor of art at the University of Minnesota Duluth, Nakajima is also a Master of Japanese Esoteric Buddhism. In the recent years, his work has focused on the behavioural ecology of cephalopods particularly in the area of cuttlefish camouflage and body pattern.

Luis Ortiz-Catedral is a Mexican-born Conservation Biologist working at the Ecology and Conservation Lab of Massey University in Auckland, New Zealand. He researches endangered birds in New Zealand, Norfolk Island and the Galapagos Islands.

Ned Rossiter is Professor of Communication at the Institute for Culture and Society, University of Western Sydney and teaches at the School of Humanities and Communication Arts. His forthcoming book is titled *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares*. Currently he is coordinating the tricontinental research project *Logistical Worlds: Infrastructure, Software, Labour* (<http://logisticalworlds.org>) with Brett Neilson.

Nina Valkanova is an interaction design researcher, media artist and creative coder, interested in the exploration of innovative and speculative ideas at the edge between technology, art and design. She is particularly interested in experimenting and conceptualizing principles for affective and engaging experience with personally meaningful data in shared and public spaces, by exploring the intersections between scientific and artistic design knowledge. Currently, she is senior research associate at the Copenhagen Institute of Interaction Design.

Illustrations

Page 7-8: *Toroidal Colonies, Interior View*, Retrieved from Space Colony Art from the 1970s, NASA Ames Research Center — <http://settlement.arc.nasa.gov/70sArt/AC75-2621f.jpeg>

Page 11: Raph Kim, *Tail Risk*, 3D agar framework, paper, Penicillium mould

Page 14: Raph Kim, *Dayrate Volatility*, 3D agar framework, paper, Penicillium mould; Raph Kim, *False Market*, 3D agar framework, paper, Penicillium mould

Pages 17-22: All images courtesy of Nina Valkanova

Pages 25-30: All images courtesy of Ryuta Nakajima

Page 34: Kerry Ann Lee (2011). *Soft Signals*, digital montage

Pages 35-36: <http://pixshark.com/nasa-outer-space-pictures.htm>

Page 40: 'An Aspiration to Enfold All', from *Thought-Forms by Annie Besant and C. W. Leadbeater*, Retrieved from: <http://publicdomainreview.org/2014/03/19/victorian-occultism-and-the-art-of-synesthesia/>

Page 46; Front & Back Cover detail: Leonid Meteor Storm, as seen over North America on the night of November 12-13, 1833, from E. Weiß's *Bilderatlas der Sternenwelt* (1888), Retrieved from: https://commons.wikimedia.org/wiki/File:Leonid_Meteor_Storm_1833.jpg

Published and edited by MODELAB

© MODELAB and the authors, 2015

No part may be reproduced without permission.

ISBN 978-0-9941220-1-8

Curators

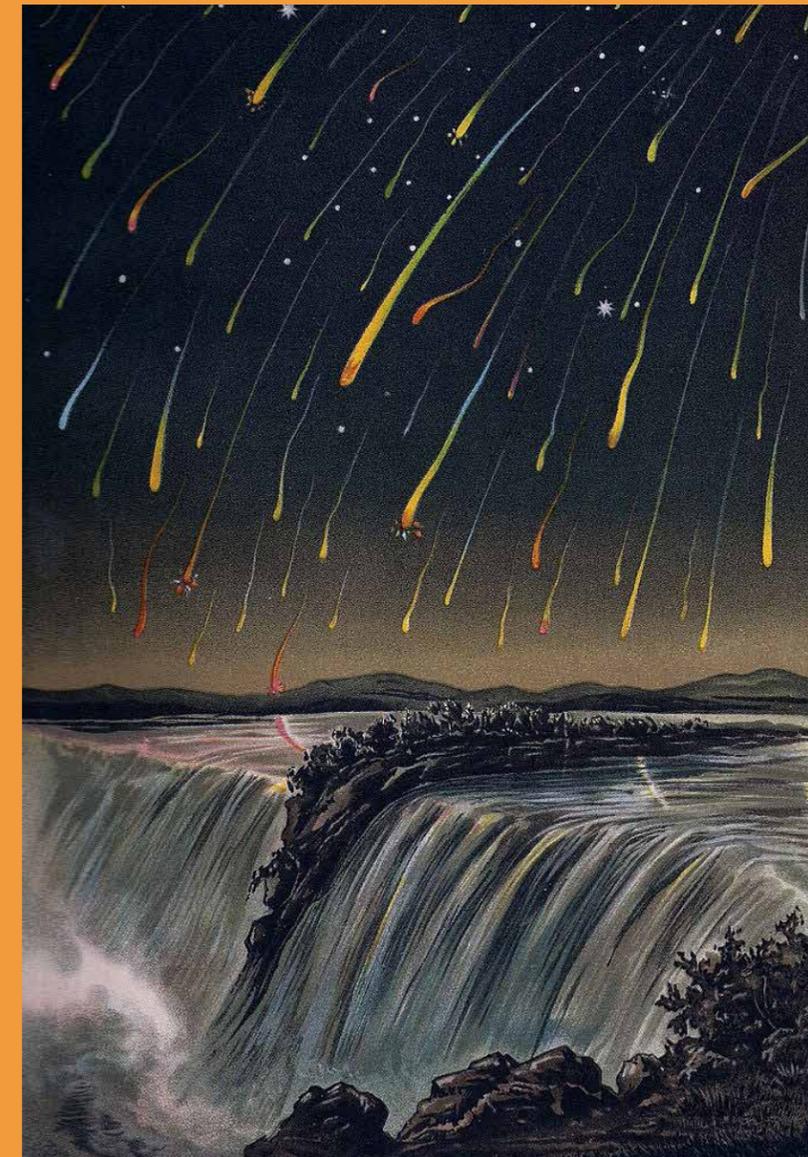
Claudia Arozqueta

Rodrigo Azaola

Design

Kerry Ann Lee

www.modelab.info





MODELAB