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INTIMATE SCIENCE FOR THE NAKED EYE: THE ROLE OF ARTISTS AND DESIGNERS (*)

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() This paper was presented at PARALELO, at Museu da Imagem e do Som, São Paulo, Brazil (March 2009) and will be published in "Paralelo - Unfolding Narratives: in Art, Technology & Environment" (editors: Gisela Domschke, Bronac Ferran, Roberta Mahfuz, Annette Wolfsberger) to be available as PDF and POD via: www.virtueelplatform.nl/paralelo in February 2010.*

When Roger Malina, astrophysics researcher and executive editor of LEONARDO [1], invited me for a quick coffee at the basement of the NOKIA Theatre, in Los Angeles, during SIGGRAPH' 2008 [2], I was sure that shortly we would start working together in a fascinating project. Citing Milton Friedman's quote – "there's no free coffee" with Roger Malina! The effervescence of his ideas, his extended network of contacts which includes visionary people from all over the world, and his incredible capacity of articulation, turn any conversation into an interesting source of partnerships and collaborations, by means of interdisciplinary projects, involving the areas of arts, science and technology.

While we were talking the light in the basement of the NOKIA Theatre changed color uninterruptedly, in a non-interactive way and with no relation to what was happening in the ambient and control over the ambience. These uncontrolled ambient and ambience seemed extremely old fashioned and pointless, especially considering the creative and technological potential of the Finnish enterprise that gives its name to this place! In that moment we exactly were talking about the crucial function of portable communication devices to create personalized and singular ambiances by controlling the ambient, in order to cater for individual needs and preferences. If I am allergic to dust, why cannot my cell phone be capable of detecting a dusty environment, and send me an alert message? If I want to know if the water from a certain tap is potable, why not have portable sensors that can provide me with this kind of information? Between sips of coffee, we talked about how much science is nowadays distant from the daily life of the common citizen and is being developed by just a few who master the scientific knowledge. "It is necessary to expand the knowledge which is today confined to these ghettos, and make science popular and accessible to all", Roger was telling me. "We need to make science intimate".

Some months later these ideas were transformed into an editorial, entitled "Intimate Science and Hard Humanities" [3].

"The projects of the Renaissance and the Scientific Revolution are incomplete. Scientific knowledge is not culturally appropriated. In many ways science has become a cargo cult. Many people use the cell phone for daily survival but could not explain the difference between a photon and an electron. One reason may be that common science does not make common sense. The information I study as a scientist is nearly all



mediated through scientific instruments. I can tell when my instrument is hallucinating. I develop new words to describe phenomena I encounter. I can manipulate concepts not grounded in my experience as a child. But this intimacy is not the daily experience of most people” (Malina, 2009).

In fact, many authors point out the ignorance of modern societies regarding important scientific aspects of their daily lives. Knebusch (2007) focuses, for example, on the detachment of Western societies concerning the awareness of climatic aspects. For our ancestors knowing the weather was a crucial element for their survival, but the modern way of life – with its artificial air-conditioned atmospheres – gave us what we could call a “second skin”, and neutralized our experience of climatic factors. Under the circumstances, our intuitive understanding regarding climatic conditions and weather changes was diminished considerably throughout the centuries. Besides, even science having organized the whole meteorological data into parameters such as temperature, atmospheric pressure, and humidity, among others, on the other side there is no other way to conceive weather understanding other than subjectively, as something solely capable of being felt in its wholeness by corporeal and sensitive beings.

“The perception of climate is the perception of an arrangement, a configuration of the real. Climate is thus a multidimensional phenomenon in which the contributions of nature, culture, history and geography are combined, but also the imaginary and the symbolic”, says Knebusch (2007). And by the means of these statements he emphasizes the important role of art not only serving the illustration of scientific discoveries, but also making our feelings possible and revealing our subjectivity in relation to weather aspects, and letting us understand the meaning that we attribute to climate in our intimate world, subjective and individual.

The search for solutions for the sustainable development of our planet demands the creation of “open observatories”, spaces that would include “artists collecting data for cultural and artistic purposes, as well as community leaders and researchers seeking ways to mediate personally meaningful access to scientific knowledge” (Malina, 2009), that would allow small communities to develop a locally generated knowledge, making easier the quest for quick solutions to the problems related with weather changes and environment. These observatories have a great potential to alter meaningfully the way people deal with science, and they can make a substantial contribution to the development of a more sustainable society.

Thus The Open Observatory project was born, as the result of a fruitful collaboration between the LEONARDO/International Society for the Arts, Science and Technology (San Francisco, USA), the Electronic Art Centre from PUC-Rio (Rio de Janeiro, Brazil), the Shristi School of Art & Design (Bangalore, India), the Royal College of Art (London, England), The San Francisco Exploratorium (San Francisco, USA), the Zurich University of the Arts (Switzerland), and The Banff New Media Centre (Canada), as showed in figure 1.

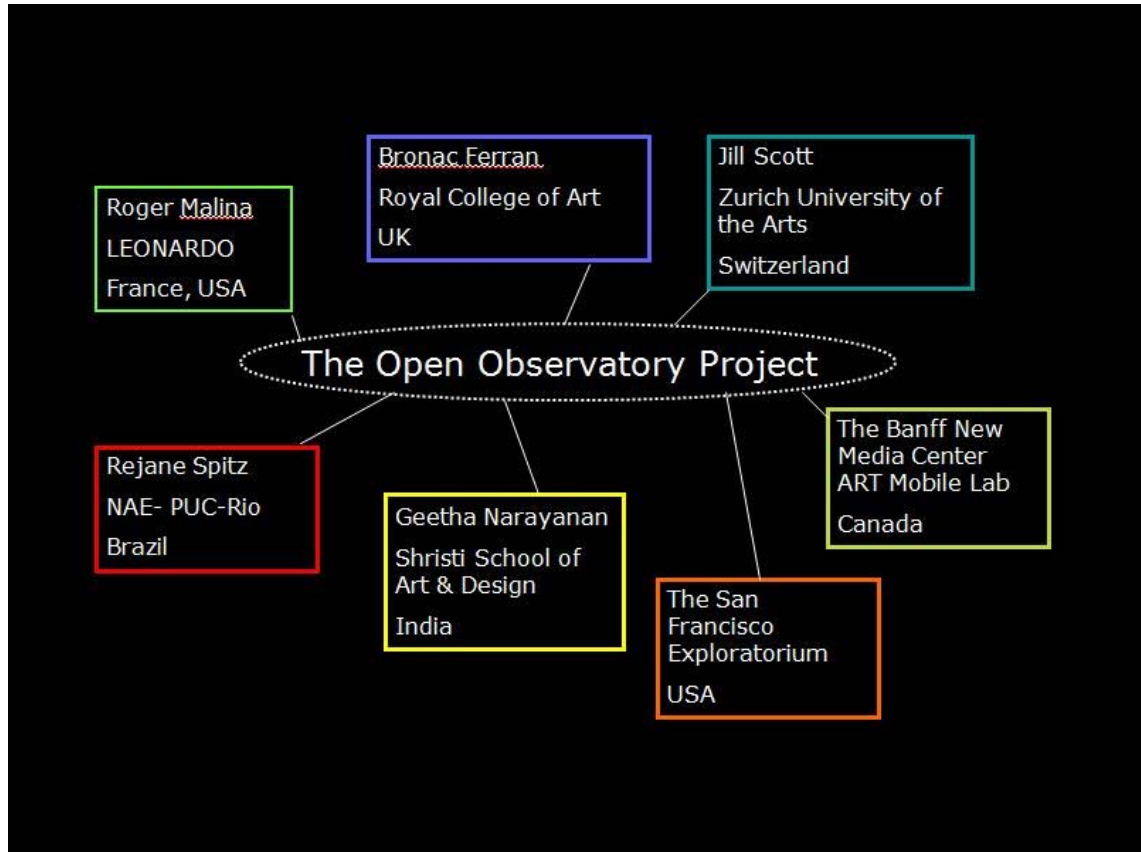


Fig. 1. The Open Observatory Project

Then the principles that would guide the creation of an Open Observatory were established:

- An open observatory is organized by a community of people interested in working together;
- It is based in a physical location with open access to the people living in that place;
- The Open Observatory operates projects which enable access and generation of scientific data and knowledge to the people living in that place, data and knowledge relevant to their survival as a community and well being as individuals;
- Subscribes to Open Source and Open Archive principles;
- Operates in a sustainable manner while mitigating the impact that it has on the world;
- Works in a network with other Open Observatories or other projects with overlapping interests and goals;
- Uses established principles of management such as Strategic Alliance practices and Creative Commons methodologies for intellectual property.

In addition, four possible projects categories were suggested:



- **Intimate Science:** Appropriation and generation of scientific data by artists for use in projects in the arts and hard humanities;
- **Micro-Science:** Conduct local scientific research of direct interest to the community hosting the Open Observatory;
- **People's Science or Amateur Science** projects: where people can contribute to larger scientific research conducted elsewhere;
- **Crowd-sourcing** projects: which contribute resources, such as computer time or volunteer time, to online projects.[4]

In accordance with the concept of the Open Observatory, Pereira (2008) suggests that “awakening the interest in science will create subsidiaries for the development of communitarian projects, solving small punctual problems, in which the solutions do not depend necessarily on the support of important institutions,” and he believes that gradually, with the increase in the number of projects, “society will develop a critical gaze in relation to this influence on the planet, verifying that, very often, small actions, on the whole, promote the greatest transformations”.

The Electronic Art Centre (PUC-Rio) and the PIMAR Project:

To inaugurate its Open Observatory, the Electronic Art Centre selected the PIMAR – Remote Monitoring Integrated Programme for Forest Fragments and Urban Growth in Rio de Janeiro – a pilot project that will continuously monitor, via high resolution satellite images, with the purpose of identifying the forest fragments of *Mata Atlântica* from the regions of Tijuca and Pedra Branca, and that is capable of generating information about the urban pressure suffered at the borders of the remaining forests in these sites, and about vertical and horizontal growth of urban areas surrounding the monitored sectors and also of the mapped forest areas.

The PIMAR Project – developed by the Interdisciplinary Centre of Environment (NIMA) from PUC-Rio – counts on the partnership of the State Secretary of Environment (SEA), the National Institute for Space Research (INPE) – responsible for monitoring the Amazon biome – and the FIRJAN, the Industries Federation of Rio de Janeiro. Starting with the creation of a software application from the Geographic Information System (SIG) for the semiautomatic actualization of information about vegetal coverage and use of the land, it provides a constant data stream that enables the action and integration of diverse public entities and institutions.

One of the goals of the PIMAR Project is to supply data and results, conferring transparency to the monitoring process, updating the population on the environmental importance of this dynamic, and stimulating them to participate as control agents against the environmental degradation and urban expansion. With this purpose in mind the Electronic Art Centre from PUC-Rio assumes the development of a web Portal for the project, aiming:

- To optimize the accessibility to data, results and images supplied by the software of the Geographic Information System (SIG) developed by PIMAR;
- To adequate the presentation of this information in order to access different groups of users, both nationally and internationally, considering as well the diversity of existing platforms and navigators;
- To confer transparency to the environment's monitoring process;
- To enlighten the population about the environmental importance of this dynamic;



- To incentivize the population to participate as control agents of nature's degradation and urban expansion in the Rio de Janeiro region, by developing a type of navigation that allows them to experience an intuitive access to information, in an interactive, creative, ludic and simplified way.

The PIMAR Project's web portal will be a social portal about the environment, where visitors will be able to visualize information about deforestation and other environmental crimes, as well as denounce and engage with the improvement of the ecological conditions of their neighbourhoods. The main target of the portal is to offer visitors a collaborative platform, motivating them to follow the environmental transformations around them through pertinent and visually interesting information. Based upon this collaboration, the visitors will create an ecological social network, exposing their opinions about environment and denouncing crimes against nature. The goal is to create a "centre for environmental claims with technical support, to show technically the exact problem pointed out, (...) and in this way maintain the population informed of what is changing across time in the hillsides of Rio". Hence, people will be able to follow "up to what extent public force is or not diminishing or stimulating the forest's growth" (Bulhões, 2009).

The portal can be personalized by each visitor by choosing from a library of information and visual apparati that will allow him/her to select and organize the interface in the most meaningful way according to their navigating preferences. The target users of the portal include: outsiders on ambient matters, technicians and professionals from the area, citizens that are already involved in environmental issues, members from NGOs (Non-governmental Organizations) and environmental activists. Besides allowing a high level of personalization of the available elements in the portal, it will also allow the transposition of the exhibited data to different mediums and platforms, extending the limits of the information. This way, even those who do not have access to computers – what, in the case of Rio de Janeiro, is the situation of an enormous contingent of people – will be able to take part in the project from their mobile devices.

Much more than a simple depot of geographic and ambient data, the project aims as an incentive for actions that might produce significant transformations in the way in which people act towards the environment. Besides informing, the portal will invite visitors to take part in preservation projects in an active way, using their available resources. For this purpose, the focus on collaborative participation will be essential. In the present moment, when social networks are part of the life of most of the internet users, there is nothing more natural than taking advantage of the potential of these networks to inform, discuss and find solutions in a medium where even small gestures – if combined in collaborative actions – might have profound impact in our way of life.



Endnotes

[1] Journal of the International Society for the Arts, Sciences and Technology, MIT Press.

[2] Conference on Computer Graphics at ACM SIGGRAPH, event that takes place annually in the United States.

[3] For Roger F. Malina, the “hard humanities” are the arts and humanities disciplines essential to the cultural transformation necessary within the next two generations (translator’s note).

[4] *Crowdsourcing* is a model of production that uses intelligence and collective knowledge by harnessing the support of volunteers spread throughout the web to solve problems, create content and develop new technologies, <http://pt.wikipedia.org/wiki/Crowdsourcing> (translator’s note).

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Acknowledgments

Thanks to the team at the Electronic Art Centre from PUC-Rio – specially Marcelo F. Pereira and Leonardo C. Leite – and to the other components of the PIMAR Project team, coordinated by the professors Luiz Felipe Guanaes Rego (Geography Department) and Raul Feitosa (Electric Engineering Department) from PUC-Rio, for their efforts on searching creative and efficient solutions, with social responsibility; to FIRJAN, for the support in the development of the design project; to Roger Malina, for the original inspiration; and to Bronac Ferran, the British Council, Museu da Imagem do Som (São Paulo) and Annette Wolfsberger, for their interest and support.

**Brief biography**

Rejane Spitz is an Associate Professor at the Department of Arts & Design at PUC-Rio University, Brazil. She was a Post-Doctoral researcher at CADRE -Laboratory for New Media /San Jose State University (California, USA) in 2003, and a Visiting Scholar at the University of California at Berkeley's Space Sciences Lab in 2002. She has a Ph.D. in Education from PUC-RIO (1993), a M. Arts in Graphic Design (1983) from the Central School of Art & Design (London, UK), a Certificate in Advanced Typographic Design (1982) from the London College of Printing (UK), a B. Arts in Industrial Design (1979) and a B. Arts in Visual Communication (1979) from PUC-RIO. Spitz also coordinates the Electronic Arts Unit, an experimental research laboratory working with art and technology at PUC-Rio, Brazil. She has been working with computers in the arts since 1983. Her works have been exhibited in Argentina, Australia, Brazil, Canada, Chile, England, Finland, France, Peru, South Africa, Spain, United States and Uruguay. Rejane has been also working as a curator of exhibitions on Electronic Art, and has written extensively on social and cultural issues related to the use of computers in developing nations. She is a member of the LEONARDO / ISAST's Editorial Advisory Board (since 1993).

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