DESIGNING COMPLEXITY - REMARKS ABOUT DESIGN MODELING SYMPOSIUM

Sabina Barcucci; Bertram Niessen. Digimag #69. November 2011

DESIGN MODELLING SYMPOSUYM LOGO

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Txt: Sabina Barcucci e Bertram Niessen / **Img: Courtesy of Leonie Felle / Anke Neugebauer**

The Canadian psychologist, **Laurence J. Peter,** once wrote: "Some problems are so complex that you have to be highly intelligent and well informed just to be undecided about them".

Contemporary Design perfectly fits this definition: the consequences of Information Technology for big architectural systems have to cross huge amounts of digital data with new design methodologies and revolutionary techniques of material production. The third edition of **Design Modelling Symposium**, held in Berlin at the **Universität der Künste Berlin (UDK)** from 7th to 12th October, turned into a privileged observatory of the challenge that researchers and designers from disparate fields are facing in the attempt to control these complex systems.

During these two days of workshops, lectures and master classes the participants - led by leading representatives of institutions, firms and research groups as **Autodesk, Buro Happold, Live Architecture Network, Institute for Advanced Architecture of Catalonia, Princeton**

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University, Evolute GmbH - could experience some of the most state-of-the-art methodologies of Digital Design at first hand. In the next three days of very full lectures, we saw a string of many of the main theorists and designers of Parametric Design, such as **Robert Aish (Autodesk), Enrico Dini (D-Shape), Neil Katz (SOM), Arnold Walz (Design to Production), David Rutten (Mc Neel).**
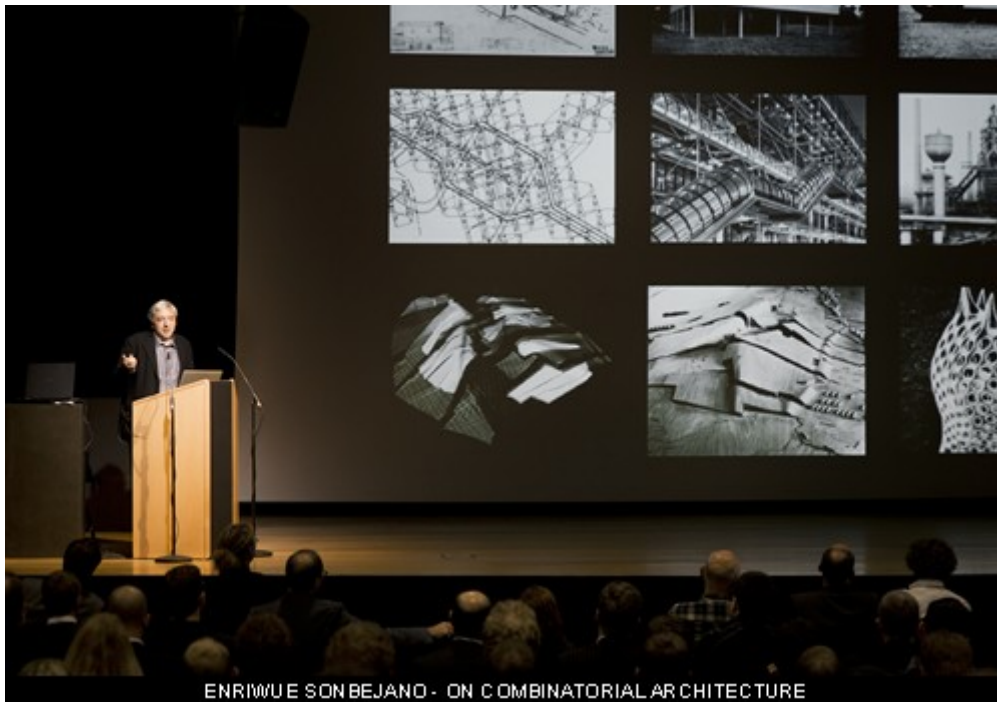
ENRIWUE SON BEJANO - ON COMBINATORIAL ARCHITECTURE

Joannis Zonitsas, one of the symposium's curator along with **Christoph Gengnagel and Norbert Palz**, invited us as observers. We had been discussing for a long time how to structure this article, and finally we agreed to write a dialogue. According to us, a classic report wouldn't make much sense, since it wouldn't be able to depict the complexity arisen from almost forty meetings held during the symposium. In order to write an article for Digimag, we preferred stressing some of the main subjects of the Symposium, by interpreting them from a not necessarily expert's point of view, and by putting the difference between Bertram's view (sociologist who deals with the social implications of Digital Technologies) and Sabina's one (designer who's devoting herself to a mapping of Digital Design methodologies) to good use.

Bertram Niessen: one of the things that has struck me the most during the Symposium was the parallelism between the new centrality of data within the process of material production and the general transformations of the information society. I've been thinking about this passage for a long time, i.e., as far digital handcraft and peer-to-peer material production concern; but I hadn't ever fully realized that it's playing out even in the architecture field.

The fact that information is now at the centre of attention is one of the main changes into the social, cultural and manufacturing systems, in which by means of radically new tools we're now able to collect quantitative and qualitative data, from social networks to every type of sensors. API

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(Application Programming Interface) makes the real time exchange of data among a variety of platforms and programs worldwide possible. Furthermore, object libraries for programming make the analysis and the design through software more and more accessible, by steadily opening new scenarios even for those categories (artists, designers, researchers) who don't traditionally deal with IT in their work. As API makes the exchange among different programs easier, new User Interface design are revolutionizing the way in which human beings can intervene on machines, by turning the cognitive models of design and production.

AMBIENT SENSOR KIT - DATA COLLECTOR DEVICE - ROBERT AISH

We can better observe these changes in the immaterial field, because the widespread use of social networks is making us aware of the ubiquity of data and of its complexity. The material production, however, is becoming more and more "data-centered" too: **Parametric and Computational Design** takes huge amounts of data into consideration and manages them through new complex methodologies.

In this case the ongoing change is less evident: we're used – on a social level – to take material production for granted, we're talking about a series of processes which materialize in the shape of objects or architectures, about them we aren't so much able to develop critical thinking, and of which we aren't so aware yet.

According to me, the Symposium was useful to uncover "the Veil of Maya", which hides the ongoing transformation of data and production material from the outsiders.

The *Modelling Hyperboloid Sound Scattering* lecture by **Jane Burry**, for example, appealingly proved how the production of prototypes for sound dispersion in music theatres can be approached,

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by correlating computational analysis, huge amounts of data and digital handcraft. It deals with practices already widespread for some years into the state-of-the-art engineering and architecture field, but to an outside observer seem to be almost "magic" visions of how information is taking a material shape into the physical world.

KUKA ROBOT

Sabina Barcucci: this is only a foretaste of technological innovation brought by Parametric Architecture. If we look beyond the external or technological features that contribute to material production, we can notice the centrality gained by this process in Contemporary Design.

In the practice we see that this centrality is the consequence of a need linked to the complexity level of new technologies. From one hand, we find some collaborations, that is to say different groups of people, living in different countries worldwide, work through the Web on a same large-scale project (called "*large-scale concurrent design*"), where the demand of updates and interrelationships couldn't work through standard tools. On the contrary, the use of management tools which speak the same language of the complexity they have to deal with, is needed, so that they can trigger off multi-authorship of the final handiwork.

Another element that distinguishes new architecture from the "old one" is optimization. We're talking about "*Building Information Modeling*" (BIM), i.e., about shapes and structures managed by numeric data, it's humanly hard to give an objective preference to, if not maybe to their purely aesthetic aspects.

It's hard to tell what's going to work better between an optimized interface according to the energy consumption of its components, and a system that optimizes in greater percentage the reduction of

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shadows cast by architecture on the context it will have to be installed in. Decisions base almost totally on the entirety of the aspects related to the huge amounts of interlinked data, BIM architecture relies on. It's possible to assess its potential only through software that can grasp its results on the whole.

This scenario consists in a software package which manages individuals and the complexity of designing and manufacturing contents. This package is linked to another platform able to assess the handiwork on its whole, and to address it every time during all the process stages. Here we can find the new centrality of the process I was talking about before. Keeping the swarm of data, individuals and updates that together give birth to a handiwork, is the biggest effort to make.

NEIL KATZ - SOM - ON PARAMETRIC THINKING
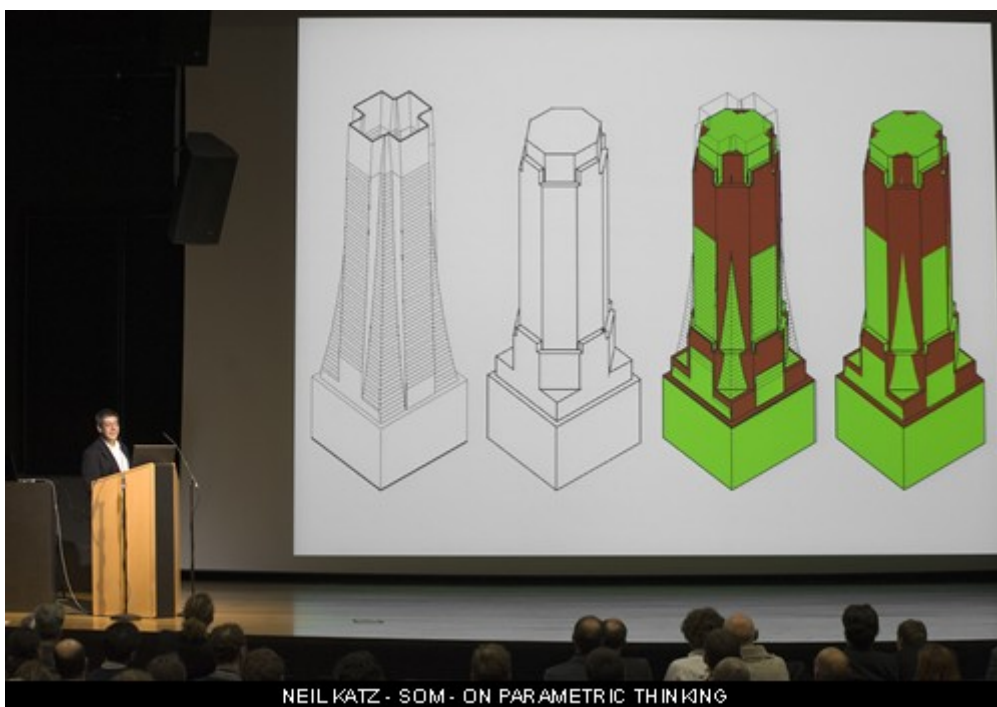
Bertram Niessen: "Complexity and Responsibility – Computational Processes and the Physical Production of Space" was the Symposium's topic of this year. Unfortunately, we couldn't attend all the meetings, but after reading what was written into the proceedings, I feel the need to clear up a doubt that cannot wait. When I take a close look at Computational Design development, I feel ambivalent about it: from one hand, I'm thrilled about its seemingly endless possibilities, from the other, I'm afraid that a hyperspecialization can cause a new kind of myopia, as far the whole meaning of the architectonic production concerns. By observing communities' practices as regards Digital Design into the networks, there's no lack of some encouraging examples of an eco-friendly awareness, but it seems in general that the attention is dangerously more focused on performance.

That's the reason why I think that the relationship among predictability, control and responsibility is going to play a completely new role into the Parametric Design field. The designer's figure who works by means of computational methodologies is inevitably shifting toward engineering. This is – without a shadow of doubt – an interesting process that converges different disciplinary knowledge,

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where new software and methodologies make the integration of the architect's "visual" view with the engineer's numeric one easier.

For those people who studied social, political or philosophical subjects, however, relating to the idea of responsibility – which seems to be implicit in some approaches to the engineer profession – has always been difficult for them. "Responsibility" seems 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 way possible, and not to focus on eco-friendly aspects. Within this view the political, social and holistic dimensions of responsibility are missing.

Obviously, we aren't talking about a problem of bad conscience, but rather about a difficulty, in presence of complex projects, to understand the systemic significance of your own work. Here's the point, I'm asking myself if the engineering process of some practices linked to Parametric Design is running the risk of focusing all the attention on the quality of products, rather than on an eco-friendly view.

SOMA - ARCHITECTS SALZBURG - MUSIC PAVILLON LECTURE

Sabina Barcucci: as far this aspect concerns, I'ld like to clarify one thing: performance optimization isn't necessarily synonymous with deontological commitment to customers. Always more often, performance is becoming a yardstick to measure the architectonic project sustainability.
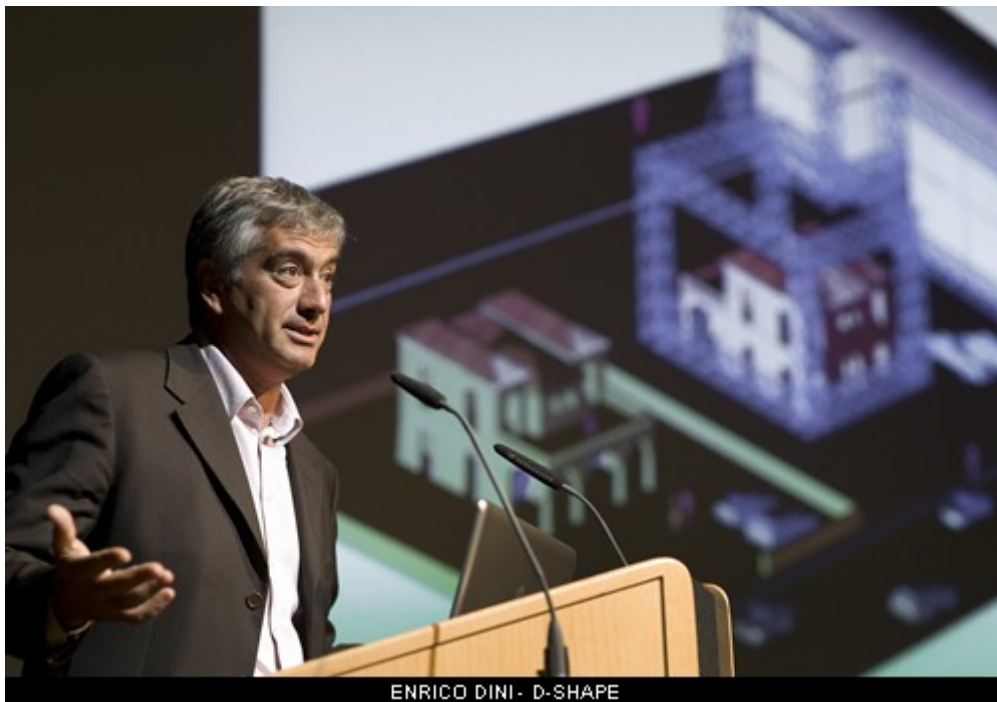
Freeform structures that can only be calculated through parametric software, could be built using less material than the standard ones. In fact, optimization processes allow to further cut the use of material. Or better, it's possible to parameterise material quantities even according to wheel transport and to work on that, so that transport will be optimized. Even this is sustainability.

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Theoretically, one can work very easily on a plenty of parameters that can mean a reduction of costs, material and consumption, thus following the "more with less" philosophy.

At the same time it's not possible to see scenarios of sustainable innovation emerging at all levels. This big collaborative machine has created professional hyperspecialization, thus enriching the occupational scenario with consultants, designers, builders, makers, coordinators and with many other figures. It's not very clear yet, how to create an organization which direct this process by really taking sustainable-qualitative parameters into account. If the collaborative machine works with partial views, the fact that the final result will own truly holistic features mustn't be taken for granted. Although the selection of data involved in BIM process bases on quality, it's unlikely that the final product – handled by hundreds of hands and brains – will follow a one-way direction, without having never diverted from the main road.

There's a big room for non-predictability, which comes from the fact that only every single hyperspecialized stage of designing and building process undergoes technologically advanced control. This makes me reconsider what I was saying before about software reliability as assessment tool, and leaves us various open questions on how to mould some conscience responsible for projects. Parametric methodologies are depicting a post-authorship scenario of architecture, i.e., at the time that a project is handled by a network of authors, it follows that there are no authors and so, no reference figures, in order to give them responsibility for projects. I think that this issue will lead to the creation of various occupational and coordinating organizations, professional figure will have to adapt themselves to. The architecture historian Mario Carpo, for example, claims that architect figure is running the risk of becoming extinct as printed paper or camera cartridges. [1]

I don't think that this view can constitute a tragedy: architect figure has been going through a crisis for a long time and that's the reason why I wish his/her tasks and duties were drastically revised, so that architects will play a keyrole in a wider process in the future.

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ENRICO DINI - D-SHAPE

Bertram Niessen: finally, in my opinion it could be interesting to try taking stock of an issue we've been discussing for years. For those people coming from Electronic Arts many aesthetic practices and methodologies of Parametric Design are nothing new. The development of groups of geometric typologies starting from a code, the evolutionary organization of shapes, the transformation according to freedom degrees under control underlie many important artists' work, from **Golan Levin** to **Marius Watz** (and also all of the authors mentioned in the book reviewed by you and me last year, *Form+Code*). **[2]**

I believe, however, that the resemblance of the shapes got to each other through similar processes tends to create some misunderstanding about the relationship between shape and function. Digital artists are allowed to ignore many functional aspects of shape and thus tend to give less weight to these designing efforts. At the same time parametric shapes tend to generate a *"wow effect"* on outsiders, and this is what pushes all the other aspects into the background.

These two elements (Art & Research and the communication difficulty of designing implications of Parametric Design) make new teaching and communicative formulas necessary, but above all outside the academics' and experts' circles. As sociologist I don't consider this an abstract issue at all. From one hand, because the amazing possibilities offered by Digital Design are clear from the research, innovation and sustainability point of view; and I think that in order to use them in the smartest way, new ways of talking about it must be devised. From the other, because I believe we can't wait to be subjected to the sudden reversal of ' *"Guggenheim Effect"*, which has caused in a lot of cities the construction of "highly iconic" buildings, sometimes also aesthetically interesting, but often less sustainable from an ecological and socially point of view.

As if the futuristic allure exerted by parametric architectures works as skeleton key to bad taste city

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plans. *"Metropol Parasol"* – designed by **Jurgen Mayer** in Seville (on which we've just debated at the Symposium) – has been also harshly criticized for being too much spectacular and unsustainable. Actually, I don't know what to think yet, but I believe that the risk does really exist.
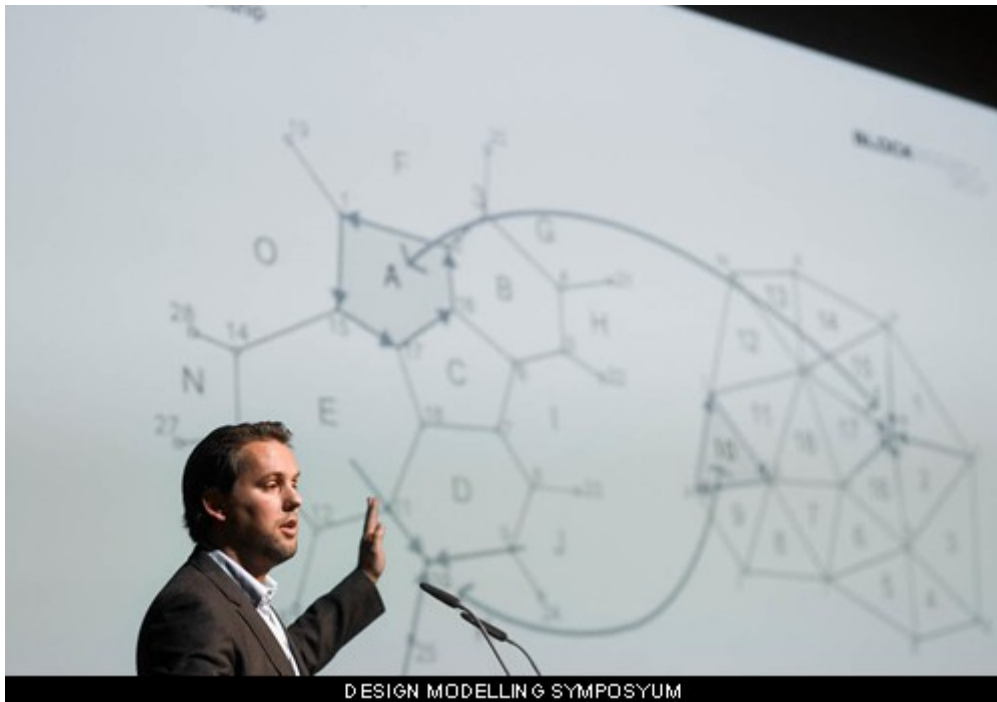
Sabina Barcucci: Contemporary Architecture has always been aiming at the future, by working for men who haven't existed yet. What **Le Corbusier** designed in the Twenties was devised for men who would live thirty years later. Modernist Architecture was based on the belief that mass production system would standardize needs and customs of societies.

Taking the function into account, we have to bear in mind that the formal leap in architecture is due to new potentialities by means of them shape can follow function. At the beginning of the twentieth century the biologist and mathematician **D'Arcy Thompson** described natural shapes as an answer to environmental forces. Best architectures have always been conceived by reasoning in this way. Nowadays this still happens, but many other dimensions have to be taken into consideration, thus giving birth to a more complex geometric language. Technology allows us to create handiworks able to fully meet external forces, by using the bare essentials of Energy and material in order to let things work. The shapes in which we'll live some day, will be the result of these kind of forces, and not a formal choice based on the idea of future men imagined by some architects. Parametric Architecture doesn't base on the idea of men, but rather on the skill at building networks of human relationships. **Rolex Learning Center of SANAA** in Lausanne is a successful example of this conception.

The *"Guggenheim effect"* phenomenon is an exception, it doesn't have necessarily to do with Parametric Architecture, but rather with great speculative manoeuvres that use urban context as exploiting field and capital deposit. It would be great if digital revolutions were able to give

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townspeople themselves – by revolutionizing the systems of decision procedures – the chance to really decide how to shape their own urban town, so that a process of urban designing does take the shape of a truly systemic one. But I'll talk about this issue another time.

http://www.design-modelling-symposium.de/intro/index.php?&lang=en

http://www.betameta.net

http://b3rtramni3ss3n.wordpress.com/

Notes:

[1] - http://www.berfrois.com/2011/02/mario-carpo-post-authorial-creation/

[2] - http://www.digicult.it/digimag/article.asp?id=1963