

# Archivolta 4(56)2012

## Summary Review

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 Sławomir Gzell  
**Theoretical Common Ground** pp. 8-16  
 Architecture Biennale in Venice 2012

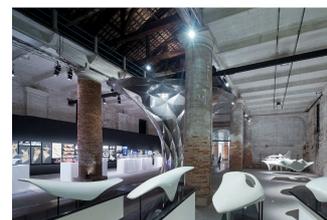


This year the Architecture Biennale in Venice is directed by the British architect David Chipperfield, who under the title *Common Ground* looks at the meaning of spaces created by buildings: political, social, and public realms of which architecture is a part of. The list of participants in this version of the Biennale include world renowned architects such as: Peter Zumthor, Zaha Hadid, Jean Nouvel, OMA, Alejandro Aravena, Alvaro Siza, Eduardo Soto de Moura, Paulo Mendes da Rocha, and Norman Foster, among others on a list of 200 offices.

As the participants did not really wish to slavishly adhere to the title of the exhibition, they could be grouped according to the proximity they reached with respect to its ideological axis, presenting the most interesting phenomena and describing their significance both for the viewer and the architecture itself. Six groups called circles were presented: the power of the people, modern Columbus, tame ecology, new technologies, arty approach, anti-imperialism and architectural imperialism.

In the summary, it is noted that the Architecture Biennale 2012 has not shown any workshop but artists' thoughts or lack thereof. Unforgiving for mistakes, unexpectedly rewards. It evaluates not through the vote and the will of the majority, but distinguishes something that suits some people's taste, just today, after a good lunch and a nice siesta. Everything is played among friends, who we should remain in spite of different views on the creative activity. Such are the Venetian meetings of the architects and such let them remain.

Krystyna Januszkiewicz  
**Zaha Hadid Architects' exhibition** pp. 18-21  
 Architecture Biennale in Venice 2012



In ZHA installation and exhibition at the Biennale the architects want to show that their recent work connects to a rather different historical strand of research. The more their design research and work evolved on the basis of algorithmic form generation, the more they learned to appreciate the work of the pioneers such as Frei Otto who had achieved the most elegant designs on the basis of material-structural form-finding processes. From Frei Otto it can be learned how the richness, organic coherence and fluidity of the forms and spaces ZHA desire could emerge rationally from an intricate balance of forces. ZHA expanded Frei Otto's method to include environmental as well as structural logics, and they moved from material to computational simulations.

One particular area of research ZHA would like to explore with their installation is the domain of light – weight shells in combination with tensile structures. They have already designed a number of complex shells as well as some tensile structures. Here, for the first time, ZHA would like to integrate these two worlds. The Arum shell is an installation made from pleated metal. ZHA will surround the installation with the documentation of their research, including key reference projects of the pre-eminent precursors in this line of research.

ZHA will show the works of Frei Otto, Felix Candela and Heinz Isler among others, as well as well include the work by Philippe Block, a young, contemporary researcher of stone compression shells.

Dagmara Sz waj

### **Snøhetta on Swiadome Wnętrze (Conscious Interior) p. 22**



In October 2012 Ole Gustavsen (*Snøhetta arkitektur landskap*) presented *Snøhetta's* designs and gave lectures for Polish architects in Warsaw, Sopot and Lodz. This series of lectures was organized by the Polish interior design group *Swiadome Wnetrze (Conscious Interior)*.

Snøhetta is well known architectural firm from Norway with its offices in Oslo and New York. The Snøhetta is the well known architectural company from Norway ever. It is so, because the international recognition that Snøhetta has received is quite unique in a Norwegian context.

Nevertheless, the firm has won two open, international competitions: Bibliotheca Alexandrina and Oslo's new Opera House, which became landmarks in their countries. A major exhibition opened in Oslo's new National Museum – Architecture on the firm's 20th anniversary in 2009. There are several other projects from the 22 years' activity of Snøhetta. Ole Gustavsen admits that smaller projects are especially interesting because they show capability of dealing with art and architecture at the same time.

Natalia Malinga

### **Urban transformation. Garden of Art pp. 24-29**

Malopolska Garden of Arts Ingarden & Ew y Architekci

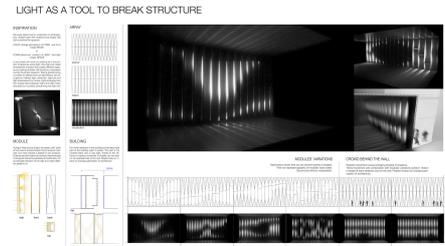


The building of the Malopolska Garden of Arts (MGA) has been constructed according to a competition-winning (Union of Polish Architects, SARP 2005) design by Ingarden & Ew y Architects. The initiative of establishing a new cultural institution in Kraków was proposed a year earlier by K. Orzechowski, Director of the Juliusz Słowacki Theatre and J. Sepiol, the Marshal of the Malopolska Region at the time.

One wing of the building holds an arts and media library, with multimedia books and music, while the section standing on the opposite site has been developed by the theatre, and it is equipped with a multifunctional events hall. The new hall – operating, as a studio theatre, conference room, concert hall, and a venue for banquets and exhibitions – holds retractable stages for 300 people. State-of-the-art stage technology is present overhead: fixed on hoists and cranes to the steel ceiling girders. This allows dramas and concerts to be performed, and exhibitions, film screenings, symposiums, conferences, art auctions, fashion shows, and many more events to be held. Altogether, the space of about 4300 sq. m houses a theatre together with a cosy cinema with 98 seats, a café, and premises for the organisation of educational, art-related activities.

The form of the building is a contextual game between “mimesis and abstraction”. In practice, this means that the building is by no means a simulacrum of the context, but rather draws inspiration from the code of contextual forms by making references to the geometry of the roofs and tissue of the neighbouring structures applied to the abstract geometrical compositions of the façades.

**Two Polish students awarded** pp. 32-33  
**International Velux Award 2012**  
Velux Polska



International Velux Award 2012 - Two Polish students from the Technical University at Krakow win Third Prize.

Anna Zagorec and Maciej Kozlowski presented project “Light as tool to break the structure”. The project searches for inspiration in photography and the relation between light, material and form. The project works with an amazing screen where the light and shadows and interaction are depending on people on the other side of the screen so that density and intensity are based on people’s movements. You do not see the people, but you are reading or measuring or getting the impression of their shadows. It is a very conceptual project, but also technically very well thought through and the renderings really describe this very illusive but beautiful condition.

Jan Lorenc, Krystyna Januszkiewicz  
**Istand of Culture, Abu Dhabi, UAE** pp.34-43  
Cultural District of Saadiyat Island



The designs presented here in Abu Dhabi, the capital of the United Arab Emirates and one of the world’s top oil producers, are to be built on an island just off the coast and include three museums designed by the celebrity architects. A comprehensive Master Plan Abu Dhabi 2030, drawn up in 2006 by SOM was initiated by Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE. It is based on the extensive urban planning research, and its aim is to emphasize the community which is to give evidence of the future of Abu Dhabi and the UAE.

In 2005, the Abu Dhabi Tourism Authority (ADTA) commissioned to Tourism Development & Investment Company (TDIC), a task to make the city of Abu Dhabi a world-class place for leisure and business. The program included residential condominiums, business areas and tourist center at the highest level. The emphasis was put on the environmental sensitivity, relationships with Nature and sustainable development. Particular attention was focused on the island of Saadiyat, regarded as a place of recreation and leisure activities for several years. The area of the island was divided into seven districts, according to the objectives of the program. One of the main components of this project is the Cultural District, which the ADTA is developing to be a destination everyone in the world of art and culture would have to visit, annually and more than once, by building a series of permanent institutions - museums, performing art centers, exhibition halls, educational institutions in the arts - that through its collections, architecture and programs will become one of the greatest concentrations of cultural experience anywhere in the world .

The winners of the Pritzker Prize were invited : Frank Gehry (1989), Tadao Ando (1995) Norman Foster (1999), Zaha Hadid (2004), Jean Nouvel, (2008), believing that cultural institutions would be represented by structures forming the creed of the architecture of the early twenty-first century.

**Zayed National Museum** p. 38  
by Norman Foster



Almost in the very center of Saadiyat Island, the Zayed National Museum designed by Norman Foster is currently being constructed. The structure formation will dominate over the island, as well as it will become an important landmark. On the one hand, the form of the museum aspires to be a symbol of the UAE national heritage, on the other, it manifests the UAE involvement in the

implementation of environmental solutions and technologies. For example, the new City of Masdar developed by Foster & Partners.

The Islamic architecture has allowed people to survive for centuries in extreme climatic conditions. Copying traditional solutions today leads directly to the new ones, based on simple ideas. In the project of the National Museum Foster skillfully uses these ideas, creating a monumental form inspired by the dynamics of the falcon wings, in order to refer to the national sport, that is falconry, practised with love by Sheikh Zayed bin Sultan Al Nahyan (1918-2004), founder of the UAE. Therefore, falcon pinions were an inspiration to shape highly energy-efficient towers with a height of 73 m do124 m. These towers, as in the traditional Islamic architecture, are designed to exchange and cool the air, and wet sheets, which are hung there, have been replaced by automatically sprinkled surfaces to ensure proper temperature and humidity. These towers are light-weight steel structures set on the top of a mound of soil with the height of 30.7 m, surrounded by the surface of water like an island, it hides in its interior exhibition space, auditorium, audiovisual rooms, etc. of a total area of 53,331 m<sup>2</sup>. The proximity of water results here from the need for its use in the second cycle and to maintain a favorable microclimate in some rooms. Surrounded by water, the island also offers 21,439 m<sup>2</sup> of public gardens designed by Dreseitl Atelier, the company with a global reputation in landscape design.

The National Museum will house an exhibition on the cultural history of the region and the union of the UAE through the story of Sheikh Zayed bin Sultan Al Nahyan's life, the father of the nation. The exhibitions related to the life of Sheikh Zayed, falconry and environmental protection in the UEA will be presented here. The exhibitions on land and water, people and heritage, history and society, science, and religion will be found here as well. The museum will house Sheikh Zayed's library.

### **Guggenheim Museum** p. 39

by Frank O. Gehry



Gehry's concept for the Guggenheim Abu Dhabi Museum, which at 30,000 m<sup>2</sup> will be the world's largest Guggenheim museum, is designed around accommodating approximately 12,000 m<sup>2</sup> of exhibition space. It will feature permanent collections, galleries for special exhibitions, a centre for art and technology, a children's art education facility, archives, library and research centre and a state-of-the-art conservation laboratory. Inspired by traditional middle-eastern covered courtyards and wind towers, used to cool structures exposed to the desert sun, the museum's clusters of horizontal and vertical galleries of various sizes are connected by catwalks and planned around a central, covered courtyard, incorporating natural features intended to maximize the energy efficiency of the building. The largest galleries will offer a grand scale for the display of large contemporary art installations. Parts of the building will be four storeys tall with galleries stacked atop each other. The museum is intended to be a centerpiece in the island's plan for contemporary art and culture. The program proposed here is much richer than the program which is currently presented in the Guggenheim Museum in New York.

### **Maritime Museum** p. 40

by Tadao Ando



A series of cultural facilities located on the shoreline of the island is opened by Maritime Museum designed by Tadao Ando. Ando's concept takes its inspiration from Abu Dhabi's natural surroundings, landscape and maritime traditions. It has a reflective surface visually merging the sea and land. Its ship-like interior has floating decks which guide visitors through the exhibition space. The presence of maritime heritage is visible not only in Abu Dhabi or Dubai, but in all the emirates. The form of Maritime Museum, by its shape, is excellently referenced to a traditional *dhow* boat, built for generations for the pearl divers in the Persian Gulf. The unique curvature of the bottom of the boat was reversed and entered into the museum space, ensuring an unconventional form

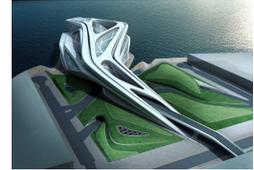
to the structure. Below ground, there is a second space – a reception hall with an enormous aquarium. A traditional *dhow* floats over the aquarium and is seen from different perspectives. At the exhibition at the Emirates Palace the model of the building in a section can be seen, showing how the form of the boat refers to the mass of the building.

Maritime Museum will be a structure with a length of 108 m and a width of 36 m, its height will reach 27 m and the cubic capacity - 61,000 m<sup>3</sup>. The museum will offer 33,300 m<sup>2</sup> of exhibition space located above and below the surface of the water, available both from the sea and land.

This is because the structure is located on the water, almost in the very center of the largest marina on the island.

### **Performing Arts Center** p. 41

by Zaha Hadid



The Performing Arts Centre by Zaha Hadid Architects is also accessible from the Arterial Road, an island ring road, full of greenery. The building becomes part of an inclining ensemble of structures that stretch from the Maritime Museum at its southern end to the Guggenheim Abu Dhabi at the northern tip. With its centre of mass at the water's edge, the Performing Arts Centre focuses its volume along the central axis of the site. This arrangement interrupts the block matrix at the Arterial Road, opening views to the sea and the skyline of Abu Dhabi.

In Hadid's Performing Arts Centre concept, a 62-m-high building is proposed housing five theatres – a music hall, concert hall, opera house, drama theatre and a flexible theatre with a combined seating capacity for 6,300 – that's 1,100 more than London's Royal Albert Hall. The centre may also house an Academy of Performing Arts. The world-class performers of the opera, drama and music from every corner of the globe will perform here. The form of the structure is an exploration of the biological analogy. The components such as branches, stems, fruit and leaves were processed and entered into the diagram of the architectural form.

### **Luovre Abu Dhabi** pp. 42-43

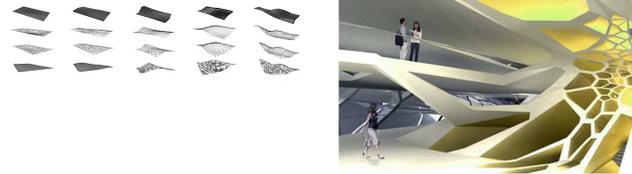
by Jean Nouvel



Farther in the shoreline, Luovre Abu Dhabi was located. The introduction of this cultural institution in Abu Dhabi is the result of agreements between the UAE and France. Just as it is in the case of the Louvre in Paris, the form of this structure will skillfully combine modernity and tradition, and the collection located here will present Abu Dhabi as a city at the crossroads of the Eastern and Western cultures. Louvre Abu Dhabi is in the course of setting up its own national collection, which will be supplemented by the exhibits borrowed from various French art institutions. Jean Nouvel argued in his vision: "This micro-city requires a micro-climate that would give the visitor a feeling of entering a different world. The building is covered with a large dome, a form common to all civilisations. The dome supported at three points, with a diameter of 180 m, is the hallmark of this structure. It covers 60,000 m<sup>2</sup> of exhibition space located in ruled solids scattered on the water. The dome is a play of light and shadow, a reference to the openwork partitions called *mashrabiya*, which as screens or partitions are used to modulate the climate in the traditional buildings of the Middle East. The design of the dome was developed using digital design tools in cooperation with Gehry Technologies. More than 1,000 sheets of databases were created, describing the results of the analyses regarding the location and parameters of the dome grid bars. Each of the more than 100,000 bars was determined and arranged on a 3D model. The optimization of the joints was carried out and the requirements of manufacture were specified as well. Based on these data, the German company One-to-One made a test model of the dome in the scale of 1: 33 (diameter of 6 m) in order to study the penetration of light.

Emanating with ultra modern architecture is aimed to show the emirate and the city of Abu Dhabi not only through the economy fueled by profits from the sale of crude oil, but also, and above all,

as one of the most attractive cities in the region in terms of creating new opportunities of development and doing business. Abu Dhabi, in its sustainable development, is moving towards the cultural integration. Saadiyat Island Cultural District is a manifesto of the creative coexistence of the new with the old, as well as a confirmation that only holistic thinking in sustainable design leads to proper relations Man-Technology-Nature-Culture.



Krystyna Januszkiewicz

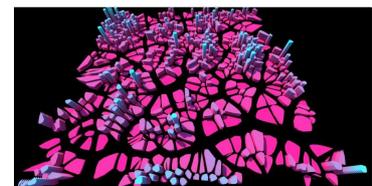
**Generative systems and tools** pp. 44-51

Generative design is the use of algorithmic processes or rules and regulations in order to receive design solutions. Using generative tools in the design requires a different approach to the creative process than ever before. This is a significant change, as the theory and practice of architecture has so far focused primarily on the form, not on the form-emerging process. These new aspects in the creation of the architectural form were first studied in Poland by Adam M. Szymiski. New developments in design processes aided by computers use generative systems to design more efficient, customized and adaptable design solutions for given contexts. In expert systems, knowledge, represented within a particular area of application, plays a decisive role in the ability to solve problems.

Computational systems have emerged as a fundamental keystone in architectural design during the last decades, marking the rise of a new area of study that engages with design cognition, computation and generative principles in contemporary design practice. Today, we are able to enlist two main areas in the development of computer aided design: “the representation and production of the geometry and topology of designed objects” and “the representation and use of knowledge to support or carry the synthesis of designs”. While the first category relates to the general use off-the-shelf CAD tools that aim to increase the efficiency or aim to automate design and drafting activities, the second has given birth to novel generative approaches that regard computation as an aid to the design process and to explore design ideas.

Currently, the architects, in order to investigate the influence of various factors on the form, resort to digital tools and generative systems. They borrow them from other disciplines and use them to design buildings and building materials. The most often used include: Voronoi diagrams, L-System, Cellular Automata, fractals, Shape Grammars and genetic algorithms. Using these tools one can get interesting forms and spatial solutions, which have been presented in this article.

The process of generative formation requires four elements: the start conditions and parameters (input), a generative mechanism (rules, algorithms etc.), the act of generation of the variants (output), and the selection of the best variant. The design artifact does not materialize until the fourth step, therefore a generative system is considered as a production system rather a representational construct. Moreover, Branko Kolarevic says: “The generative role of new digital techniques is accomplished through the designer’s simultaneous interpretation and manipulation of a computational construct. The capacity of digital, computational architectures to generate ‘new’ designs is, therefore, highly dependent on the designer’s perceptual and cognitive abilities, as continuous, dynamic processes ground the emergent form”.



Przemysław Jaworski

**Generative Cities** pp. 52-55

Can algorithms help with designing cities? This question has been asked by architects and designers over and over again, but it seems that clear answers are yet to come. There still aren’t too many verified methods, although they’re emerging slowly. We’ve seen computer programs

able to generate a three dimensional detailed model of a city (for example CityEngine), but mainly for the purposes of CGI animation or visualisation. However, if we want to go deeper into understanding the processes standing behind the formation of urban tissue, we need a radically new approach - algorithmic simulation.

Adam M. Szymiski

### **Digitally designed architecture as a compulsory subject** p. 56



In the current academic year, at the Faculty of Architecture of University of Technology in Poznań, the curriculum included a new subject: Digitally Designed Architecture.

This subject covers the knowledge of the design, theory and practice of architecture, emerging using digital tools of the CAD / CAM / CAE system.

On the initiative of Professors Wojciech Bonenberg and Jerzy Suchanek, the dean of the Faculty, for the first time in Poland, the topics that relate to the effects of using digital technologies in architectural design have been presented. Subjects of this profile, for more than a decade, have already entered permanently into the curricula of architectural schools, not only in the countries of the European Union.

Boris Siewczyński

### **The Isle of Lords** pp. 56-57

#### **Virtual reconstruction based on current research hypotheses**

The Faculty of Architecture of University of Technology in Poznań had a unique opportunity to take part in an unusual project - a documentary film on the history of Ostrów Lednicki, and at the same time, the genesis of the relics of the First Piasts residential, sacred and defense architecture, which fascinates the scientific world. Virtual architectural reconstructions are an illustration for this documentary film.

Mateusz Zwierzycki

### **Digital Physicality I Physical Digitality** pp. 59-63

#### **The 30<sup>th</sup> eCAADe Conference**



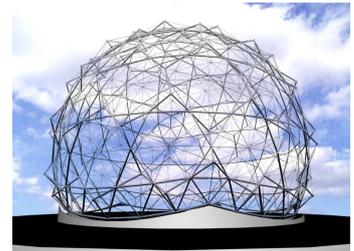
The eCAADe Association (the Association for Education and research in Computer Aided Architectural Design in Europe), was founded in 1983 to promote sharing information and knowledge pertaining to the use of computers in research as well as education in architecture and related professions. Its sibling organizations are: ACADIA, CAADRIA, SIGraDi, ASCAAD, CAAD Futures - which cover most of the world with their activities.

This year, the 30th eCAADe conference took place in Prague, at the Faculty of Architecture of Czech Technical University. It was organized under the banner of "Digital Physicality, Physical Digitality", which was meant to emphasize the role of information in all domains of science including architectural theory and practice. It took four days to present all the papers to the public, showing how many branches of design emerge with new ideas on how to embed computational advantages over this discipline.

In this article we write about a few selected presentations, which can be perceived as samples of emerging directions in architectural practice, theory and education. In the field of data processing we present Behavioural surfaces.- A Project for the library of the Faculty of Architecture in Florence. It is an elegant example of optimization and acoustic design aided with computers shown in an Acoustic Environments pavilion. New approaches to structural optimization are introduced with Swarm Materiality. We also present workshop results in AB-USE Computation in architecture, as well as Robots in Architecture.

Janusz Rębielak

**Numerical methods in modeling of space structures** pp.64-71  
**Forms of roof covers**



The paper presents examples of applications of numerical models, defined in the programming language Formian in the design processes of selected types of space structures needed for various forms of the roof covers. Application of these numerical models facilitates the cooperation between architects and engineers as well as accelerates the design process of sometimes very complex forms of space structures. An innovative method of secondary grid deformation is described there, which enables very regular subdivisions of the surface area of a sphere, which make it really useful in designing geodesic domes. The article comprises examples of author's projects where the unique structural solutions of the roof covers are applied. The main point of the author's design method is to express the rules of the theory of structures in the shape of the structural system, and to feature it directly in the architectonic form of the building in the same time. There are presented selected examples of building complexes designed by the author in the last decade, that may represent the declared way of shaping of architectonic forms of the objects, which have to meet various requirements of usefulness conditions of useful purposes.

Krystyna Januszkiewicz

**Fudge Pop-Up. Zaha Hadid Design Gallery** pp. 72-75



Fudge Pop-Up hair salon is a space teamed up with Zaha Hadid Design Gallery . Cult hair brand Fudge was designed by Zaha Hadid in collaboration with the Fudge hair brand in celebration of the London Fashion week and the London Design Festival (17-23 September 2012).

The salon was located on the lowest floor of the gallery, where a white relief model of one of Hadid's latest buildings protruded from one of the walls. Named King Adullah Petroleum Studies and Research Centre, this building is currently under construction in Saudi Arabia.

Located underground the second part of the exhibition by Hadid includes furniture, particularly a large scale dining/conference table with an enigmatic and liquid form.

Named the Aqua Table it consists of two material elements: a lower structural body made from polyester and a silicon gel top with a tactile non-slip surface. The design and manufacture of the Aqua Table has only been made possible through the latest advances in technology. Its form was generated on complex geometry software (using nurb surface modeller). This design was then sculpted by CNC (Computer Numerical Control) milling to enable manufacture.



Daniela Szymczak

**Interiors of Duda Clinic** pp. 80-81

There are flavours of the month in every fashion, because it is fickle. But there is something that is never out of fashion: ageless, timeless and noble classics. That is why simple, elegant minimalism predominates in Duda Clinic. Its interiors are its trademark. Its aesthetics rejects flamboyance and ostentatious luxury. Subdued colours with the dominance of white, complimented by shimmering details made of chrome and steel as well as pared-down details create the effect of purity, precision and trustworthy professionalism. They are details that decide about the character of the whole project. The lamps in the form of a drop of quicksilver, which is also the main component of dental amalgam and silver, tooth-shaped chairs which add some lightness to this minimalistic decor. They are like sophisticated jewellery dressing up a little black dress.