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Parametric Architecture in the Urban Space

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Abstract. The paper deals with the parametric architecture which is trying to introduce a new spatial language in the context for urban tissue that correspond to the artistic consciousness and the attitude of information and digital technologies era. The first part of the paper defines the main features of parametric architecture (such as: folding, continuity and curvilinearity) which are are characteristic of the new style of named the "parametricism". This architecture is a strong emphasis on geometry, materiality, feasibility and sustainability, what emerges is an explicit agenda promoting material ornamentation, spatial spectacle and formal theatricality. The second part presents result of case study, especially parametric public use buildings, within the tissue of city. The analyzed objects are: The Sage Gateshead (1998-2004) in Gateshead, Kunsthaus in Graz (2000-2003), the Weltstadthaus (2003-2005) in Cologne, The Golden Terraces in Warsaw (2000-2007), the Metropol Parasol in Seville (2005-2011) the King Cross Station (2005-2012) in London, the headquarters of the Pathé Foundation (2006-2014) in Paris. Each of the enumerated examples shows a diverse approach to designing in the urban space, which reflect the age of digital technologies and the information society. In conclusion emphasizes, that new concept of the spatialization of architecture is the equivalent of the democratization of the political system, the liberalization of the economy, among other examples.

1. Introduction

In the twenty-first century the digital design tools, which coupled with the computer technology production, have opened new possibilities, not just in shaping the architectural structures, but also interferencing with the existing urban and building structures. Contemporary avant-garde architecture and urbanism is addressing this societal demand via a rich panoply of parametric design techniques. This kind of design is able to increase the information density of the built environment. Employing associative logics correlates the different urban and architectural subsystems in ways that make them representations of each other. In recent years, parametric architecture has, as digital possibilities are explosively increasing, made up ground in the design industry, replacing the traditional architecture which cherishes the purpose of traditional shapes of building. Therefore, the process can easily result in a number of different spatial solutions by replacing parameters. Parametric architecture finds itself at the mid-point of an ongoing cycle of innovative adaptation – retooling the discipline and adapting the architectural and urban environment to the socio-economic era of information society.

2. Parametricism as Style, Continuity and Curvilinearity

The parametric design, three-dimensional modelling techniques and rapid-prototyping technologies, four-dimensional animation and simulation protocols, as well as synchronized multimove robotic

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systems lie at the core of the theorization and manifestation of post digital architectural production – in academia as well as in practice. Although there is a strong emphasis on geometry, materiality, feasibility and sustainability, what emerges is an explicit agenda promoting material ornamentation, spatial spectacle and formal theatricality. Assuming that architecture is cultural production, it's talk discusses the intrinsic parametricism or neo-baroqueness of the present-day architectural debate with a critical eye directed at the engagement of technology and emotion on various scales (from micro to macro).

2.1 Parametricism as a new style for architecture

The term "parametricism" was coined in 2008 by Patrik Schumacher, an architectural partner of Zaha Hadid (1950-2016). He presented and discussed the term at the Dark Side Club 1 at 11th Architecture Biennale, Venice 2008 [1]. His use them to define the current parametric architecture and urbanism as a distinct style - "Parametricism is the great new style after modernism (that) aims to organise and articulate the increasing diversity and complexity of social institutions and life processes within the most advanced centre of post-fordist network society" [2]. Schumacher believes that architectural innovation proceeds by the succession of styles. Consequently, from postmodernism, to deconstructivism, and now to Schumacher's parametricism we have seen architecture evolve exponentially in less than a century. In his analysis on the succession of architectural styles Schumacher references Thomas Kuhn (1922-1996) and Imre Lakatos (1922-1974) as scientific and psychological foundations.

Parametricism as a phenomenon in the history of architecture has defined many rules for the current designers and for the future practitioners to follow. In the style of parametric architecture, geometry has played and is continuing to play an integral role. Descartes' geometry and the conventional Euclidean language are rejected. The old boxes and straight lines Schumacher calls "primitive shapes" and explains why we no longer feel comfortable inside spaces divided into isolated square-shaped compartments, connected by empty corridors and sitting on square-shaped chairs because of an architecture should increase interaction and information exchange, and can no longer insist on physical separation as it did until now[2]. The digital design tools based on the NURBS curves and surfaces have released the architects' imagination from the simply drown curvilinear forms. The new language of non-linear forms, or language called "morphic" is talking about the tough substances and liquids, replaces them. In the realm of architectural form, some professionals, from "signature" architects to environmental and organic designers, are strong advocates of free-flowing curvilinear forms.. They assume that the use of curvilinear forms is sympathetic to the body, mind and spirit, although there is little empirical research to confirm this claim. The new forms have been already visible even in the historical area of cities.

2.2 "Le Pli" and Continuity

In the book published in 1988, titled *Le Pli. Leibniz et le baroque,* Gilles Deleuze predicted the inevitable shift towards folds and continuity in different kinds of art [3]. For Deleuze *le pli* (the fold) is the principle of construction of the world leading directly to the concepts of continuity and continuation, so eagerly used by architects today. Continuity is included in the definition of *le pli* and is to be understood not as rectilinearity, but on the contrary, as a linear maze of continuation. It is assumed that there are no discontinuities, refractions or tears in the world of matter, which at the immaterial level means no conflict or contradiction. It is different in the tissue of old towns, where the substance has layered for centuries. The old techniques are in a constant conflict with the newer ones, and the evocative content of the forms and their associations contradict each other in the dialogue of history. However, the preserved buildings or their remains represent the state of consciousness of the eras in which particular styles were born. Historical continuity is perceived through the complexity and contradiction of various interventions performed constantly on the body of the city. In the maze of streets and squares, daily life is lived, which no longer corresponds to the spirit of the past and requires new technical and spatial solutions, new forms at the point of contact. According to Leibniz's idea, Deleuze's maze of matter continuity corresponds with a maze of continuity in the human soul. The two planes communicate because "the continuity of matter raises the soul" to the next level. And on the curtain stretched between

the levels, the folds are formed, like the skin on the body. This is a great Baroque assembly, created by Leibniz between the lower level with windows and the higher level blind and closed, but intelligent as a music room, which translates the movement visible below with the sound. A few years later, Jeffrey Krausse takes this discourse explaining the fold as "something more than a surface" because the fold has potential energy and, like the skin on the body, it reacts to the organism's internal stimuli and external influence of the environment. As in Leibniz's description cited by Deleuze, architecture can be understood as the "skin of matter" stretched over the immaterial organism of internal program, economic, or institutional events, and through the "windows to the outside", (defined as a contact with the outside), responsive to the environment [4]. This meant the replacement of deconstructivist discontinuities with a new continuity, and for Krausse it was a shift from the concept of "architecture-the-costume" to the concept of "architecture-the-skin" with all the consequences of that procedure.

2.3 Curvilinearity and folding

Referring to the growing interest in curvilinearity and folding in architecture, in 1993 Greg Lynn published an essay in AD "Architecture Curvilinearity: The Folded, the Pliant, and the Supple"[5]. He tied together Gilles Deleuze, Rene Thom (the French Mathematician 1923-2002), cooking theory, geology, as well as the aesthetics of the viscous substance and ductile material. He also pointed to the work of Jeffrey Kipnis and John Rajchman to refer them to the representative work of Peter Eisenman, Frank Gehry, and Philip Johnson. The essay argued that the interest in curvilinearity is not new, as proved by the architecture of the Baroque period. Greg Lynn's essay forms a basis to agree that curvilinearity newly cemented the architectural thought by identifying and stressing the importance of the new smoothness in architecture. His background of philosophy and his attraction to computer-aided design made him an ideal person to publicize, in effect, define the fold in architecture as the intense interest during the remainder decade.

It was the first attempt discourse of architectural theory position of curvilinearity in architecture, designed in the digital topological areas. With this development of complex design, he has observed two paths that are typically taken: conflict/contradiction and unity/reconstruction. However, another path is coming to the forefront that involves a smoothness that steers away from these other methods. This smoothness is obtained by mixing different elements together that work together to create the smooth or pliant form. Pliancy depends upon alliances with all other elements involved (whatever they may be), both internal and external. The important element of this strategy design is folding. Folding involves mixing unrelated elements together to create one continuous mixture. The elements within the mixture are still intact in and to themselves yet integrated to form a cohesive element. One way to achieve pliancy is through viscosity. A good example of viscosity is hot lava flowing through the path of least resistance while picking things up that are in its path. Where the form is contradictory it is further designed using continuous, flexible systems. This type of architecture is typically cited where other buildings are posing a contradictory, conflicting, and discontinuous identity. Greg Lynn's essay provides a basis to agree that "curvilinearity cemented the shift in architectural thought by identifying and highlighting this new architecture of smoothness [5].

However, does this judgment authorize the introduction of curvilinear topological forms to context of architectural and urban design? The publication of Lynn's essay in Architectural Design coincided with the extension of the Waterloo Station in London, located in the stratified city tissue. The canopy platforms 400 meters long smoothly pushed into the dense buildings (Figure1a-b-c). Nicholas Grimshaw, in preparing the geometry of the roof covering applied the parametric model. Soon, after Grimshaw went Norman Foster, and other well-known designers. Parametrically designed non-linear architecture is able to increase the information density of the built environment. Everything must resonate with everything else says Schumacher. This should result in an overall intensification of relations, which gives the urban field a performative density, informational richness, and cognitive coherence that makes for quick navigation and effective participation in a complex social arena.



Figure 1a-b-c. Nicolas Grimshaw, Waterloo International Terminal, London, 1989-1993

Our increasing ability to scan an ever-increasing simultaneity of events, and to move through a rapid succession of communicative encounters, constitutes the essential, contemporary form of cultural advancement. Further advancement of this vital capacity requires a new built environment with an unprecedented level of complexity, a complexity that is organized and articulated into a complex, variegated order of the kind we admire in natural, self-organized systems.

3. Parametric architecture within the tissue of city – the case study

Over the last decade of the 20th century, contradictions in form and urban space were represented with the development of complex design. We observed two typically taken paths: conflict/contradiction and unity/reconstruction. For example, Frank O. Gehry using CATIA software designed “Dancing House” (1992-1996) in Prague. This corner building was set on a property of historical significance. Its site was the location of a house destroyed by the U.S. bombing of city in 1945. The plot and structure lay decrepit until 1960 when the area was cleared. The neighbouring plot was co-owned by family of Václav Havel who spent most of his life there. This very non-traditional design was controversial at the time because the house stood out among the Baroque, Gothic and Art Nouveau buildings which Prague was famous for, and in the opinion of some, it did not accord well with these architectural styles. “Dancing House” is different, in a dialogue with the existing pre-formed matter it picks the main points of its design to express its own complex opinion.

The shift from the concept of "architecture-the-costume" to the concept of "architecture-the-skin" announced by Krausse, is represented by Sage Gateshead (1998-2004) by sir Norman Foster. The building is located in Gateshead on the south bank of the River Tyne, opposite the center of Newcastle. The architectural form of the building was designed in a virtual environment. The animation software was used not as a medium of representation, but of form generation. The digital tools are important for any parameter-based design to create both the unfolding of an internal system and the infolding of contextual information fields. Architectural form, is not only a manifestation of its internal, parameter-driven relational logic, but it also has to engage and respond to dynamic, often variable influences from its environmental and socio-economic context. Architectural form, instead of being conceived as a stationary, inert construct, is conceptually a highly plastic, mutable entity that evolves dynamically through its transformative interactions with external, gradient forces. The building was designed with environmental issues in mind and its aerodynamic form channels the predominant local winds to provide natural ventilation. The Sage Gateshead is a regional music centre of international standing, with approximately half a million visitors each year. The stainless steel roof encloses the entire complex, which is 'shrink-wrapped' around the buildings beneath. The spectacular curved steel roof, which weighs 750 tonnes, is made from 3,000 stainless steel panels and 250 glass panels (Figure 2a-b-c).

The Sage Gateshead addresses the nature of public space and the concept of the democratic, accessible ‘urban living room’. The building at the waterfront is located at the contact point between the historic urban landscape of Gateshead with its traditional local development, and the world heritage – the arched bridges that are masterpieces of engineering.



Figure 2a-b-c. Foster&Partners, Sage Gateshead, Gateshead, 1998-2004

Last of them, the Gateshead Millennium swing footbridge completed in 2001, is the first bridge designed and fabricated completely digitally. Does this historic context, being already in opposition, call for mediation and a dialogue mitigating a conflict, or rather a spectacular manifestation of the higher level of awareness and technical capabilities, emphasizing the beginning of another millennium of civilization development?

The presented samples of introducing new, non-linear forms into the existing urban tissue, prove the need for a new urban design strategy. At the turn of the twentieth and twenty-first centuries, new architecture called neo-Baroque or digital Baroque, driven by the development of technology is looking for contemporary theoretical basis for the new common practice in design and construction [6].

In the 21st century, another path is coming to the forefront that involves a smoothness that steers away from these other methods. This smoothness is obtained by mixing different elements that work together to create the smooth or pliant form. Pliancy depends upon alliances with all other elements involved (whatever they may be), both internal and external. The third element of this method of design are folding and curvilinearity. Folding involves mixing unrelated elements together to create one continuous mixture. The elements within the mixture are still intact in and to themselves, yet integrated to form a cohesive element. One way to achieve pliancy is through viscosity. A good example of viscosity is hot lava flowing through the path of least resistance while picking things up that are in its path. Where the form is contradictory, it is further designed using continuous, flexible systems. Pliancy depends upon alliances with all other elements involved (whatever they may be), both internal and external. This kind of architecture is typically cited where other buildings are posing a contradictory, conflicting, and discontinuous identity.

A spectacular example is Kunsthaus in Graz (2000-2003), where Cook and Fournier synthesized the innovative design approach within the old town in Graz saturated with the Baroque architecture, designated as a UNESCO world heritage site. Graz Art Museum was built as part of the European Capital of Culture celebrations in 2003 and has since become an architectural landmark in the city. The right bank of the river Mur, then a neglected part of the town, seemed a good location, and the old cast-iron Eisernes Haus (1848) was an ideal starting point. These forms are a lively correlation with the distinctive architecture of the Kunsthaus smooth building. Biomorphic shape of the Kunsthaus has been achieved by Peter Cook and Colin Fournier as a result of adjustments after environmental analyses performed by engineers Bollinger + Grohmann from Frankfurt. The Curvilnear BIX Façade of the museum represents a singular fusion from architecture and New Media. BIX, ("Big" and "pixels") is the acrylic glass skin of the eastern side of the building toward the Mur and the old town, and represents an oversize urban screen, which serves as an instrument for artistic productions [7]. BIX projects accompany different exhibitions and are not transported into the public area, also the direct environment is defined and shaped. Beyond that, the skin offers also a possible drilling platform for art projects, which bring up for discussion the dialogue between media and area 930 40 Watt fluorescent rings are embedded in the 900 m² outer skin, with the illumination level of each one being steplessly variable between 0 and 100%. Each light ring is as a pixel, which can be served by a central computer. In this

way they can be developed as roughly screened indications, texts and film sequences, which radiate far into the urban area and thus, the blue blister of Graz with a screen of immense size makes an art gallery. Thus the concept of the skin was radically redefined transforming the facade into a low resolution computer display, a "communicative display skin", fusing architecture, technology and information. The Kunsthaus facade as a display constitutes an extraordinary medium for presenting art and related information transfers. It is an attempt to describe the way in which the representational sphere (the reception of an image) and the instrumentalized sphere (the reception of a form) become respectively deterritorized and deconstructed into a new image-form with a new intensity.

Multiplication and deformation of the image on curved surfaces often leads to a curved and unreal reality. Smooth curvilinear forms are capable of creating unpredictable references and associations with a cultural context. One such example is the department store Weltstadthaus in Cologne (2005) designed by Renzo Piano. It is the object of a double-curved surface responsive to environmental changes. It is divided through a sequence of parametric equations, determining the wooden ribs spacing of the individual curvature. Glass panels are mounted onto the ribs, each with a different curvature, and a shading system and sensors from the inside to enable the facade to react to the sun's path. Also, the rain-water is collected [8]. The non-linear Weltstadthaus parametric architecture creates continuities between site and structure, implementing conceptual design that entrain perception to follow patterns that connect the outside and the inside, both physically and psychologically.
A contact with the urban context determines the relationship of the object with the existing urban fabric, destroyed during World War II. This fabric defines a path which extends to the direction of the form, where continuity and flexibility results from calculation relationships between the surface and the structure, the function and the form (Figure 3a-b).

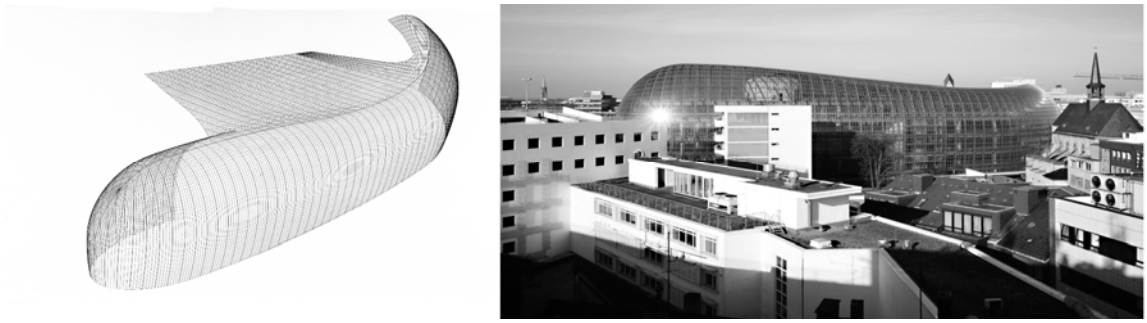

Figure 3a-b. Renzo Piano, Weltstadthaus, Cologne 2003-2005

The development and distribution of parametric design tools based on NURBS (*Non-Uniform Rational B-Spline*) in the first decade of the 21st century has increased the interest in various kinds of spatial structures. Parametric thinking has introduced the shift in the mindset between the search for a specific static and defined formal solution, and the design of the specific stages and factors used to achieve it. Computer linked CNC fabrication techniques of many kinds have become an integral part of the design process, while new digital tools are allowing engineers and architects to understand in far more detail the behaviour of load carrying surfaces, and to generate new architectural forms. CAD/CAM technologies create new opportunities by allowing the production and construction of complex forms, which until recently were difficult to design and build using traditional construction technologies. A virtual free surface imposes such technical solutions and materials which question the traditional thinking about a building. With the emergence of the large scale, free-form surfaces in architecture, an essential question arises: how to proceed from a geometrically complex design towards a feasible and affordable way of production [9]. The production strategies used for two-dimensional fabrication often include contouring, triangulation (or polygonal tessellation), use of ruled, developable surfaces, and unfolding. Geometry of the space frame or grid is then a consequence of the divisions. The Digital

tectonics is becoming a seminal concept in recent discourse in the field of material-based design in digital architecture. Today, the theory of architectural recognizes the rationality of tectonic articulation as a mine strategy of articulation [10]. It is no self-serving pursuit and must remain subordinated to the concern of facilitating social functions. The agenda of articulation selects the final solution from all technically viable solutions according to the phenomenological and semiological requirements. An excellent example is the canopy over the Golden Terraces (2000-2007) by The Jerde Partnership International in Warsaw. This is the largest (10 200 m²) single glass and steel roof covering the central shopping area was provided by Waagner-Biro.



Figure 4a-b-c. Jerde Partnership International, the Golden Terraces, Warsaw, 2000-2007

The Arup engineers imported Jerde's basic roof mesh geometry from AutoCAD and manipulated it using additional parametrical software to orientate every RHS member perpendicular to the bisector of the angle of the two glass panels it supports. The result is a continuous triangulated grid of steel rectangular hollow sections (RHS) of constant size, 200 mm deep by 100 mm wide, with wall thicknesses varying from 5-17.5 mm depending on the forces in each member and 4,780 glass panels has a unique geometry. Beneath the glass canopy an area the equivalent of ten football pitches - the boundaries between indoors and outside disappear [11]. The freeform of canopy brings a new dimension to the idea of transparent architecture for public use (Figure 4a-b-c).

The world's largest wooden parametric structure is the Metropol Parasol (2005-2011) by Jurgen Mayer H. Architects in Seville. Located at La Encarnación square within historical context of the city structure has dimensions of 150 by 70 m and an approximate height of 26 m. The structure consists of six elements in the form of giant mushrooms, whose design is inspired by the vaults of the Cathedral of Seville and the ficus trees in the nearby Plaza de Cristo de Burgos. The free-standing parasols cover an area of 150 m x 70 m, which is one of the largest architectural timber structures ever built.

The Metropol Parasol is organized in four levels. The underground level houses the Antiquarium, where Roman and Moorish remains discovered on site are displayed in a museum. On the first level there is the Central Market. The roof of the first level is the surface of the open-air public plaza, shaded by the wooden parasols above and designed for public events. Interior fountains and plants also help to provide a cool climate during the intense summer heat. Levels numbers 2 and 3 are the two stages of the panoramic terraces (including a restaurant), offering one of the best views of the city centre (Figure 5a-b-c).

The polyurethane coating protects the wood and allows it to breathe - a sort of natural air conditioning - and the wood itself doesn't give off hazardous fumes when it burns. It is also sustainably planted, with a certificate PEFC (Programme for the Endorsement of Forest Certification schemes), granted by the Finnish Forest Council of Certification. The coat of the structure is self-cleaning, and only needs repainting every 20 to 25 years [12].

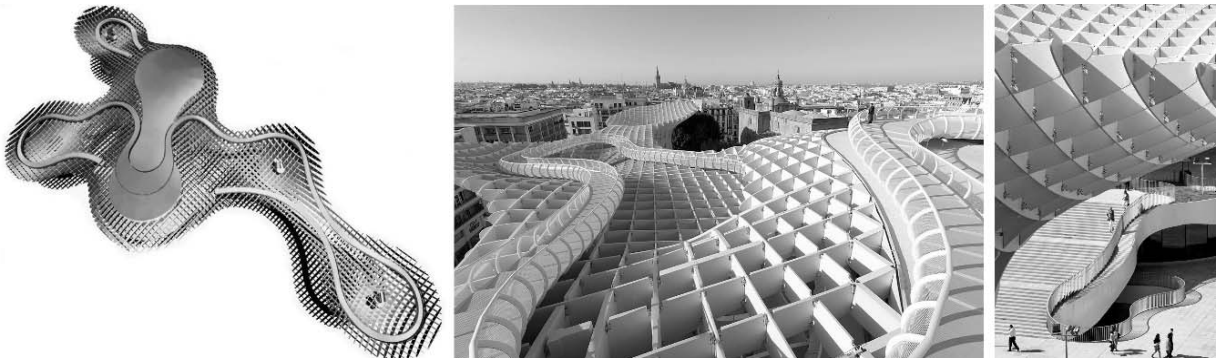

Figure 5a-b-c. Jurgen Mayer H. Architects, Metropol Parasol, Seville, 2005-2011

The multi-curvature structural form of high complexity refers to the Baroque - its harmony and fusion of the arts and the sciences, the structural 'truthful' efficiency of the Gothic, which nowadays is experiencing a revival under the premise of the parametric approach, of virtual scripts, and formal organicism (understood as evolutionary mimicry). In this sense, the Metropol Parasol is part of the existing historic context of the city, developed by the subsequent eras and their style. It re-defines the complete dependence on the square of the fabric of the city (effect, action, space), the separation of below (matter, function) and above (manner, vision), of tectonics and textures, of movement and stasis, of knotting and folding, of light and shadow, of thick and thin, of topologies (multiplicities of geometry and methods) and infinity (convolutions and illusion). The Metropol Parasol is an example of viscosity using continuous, flexible systems.



Figure 6a-b-c. John McAslan + Partners, Arup, Western Range King's Cross Station, London, 2005-2012

Extension of Western Range King's Cross Station (2005-2012) in the center of London is also looking for new relationships in the existing urban fabric but with the preserved historic substance (Figure 6a-b-c). The station was opened in 1852, and for 1972 it was the largest interchange station in London, which arose in the vicinity of many hotels and service areas saturating stylistically complex urban fabric of buildings. The city growing transport needs forced to increase constantly for another platform. Currently station supports 11 platforms, of which 8 are located in the "old" building. The new concourse is a lattice structure which, as the half open umbrella, is adjacent to the eastern facade of the "old" station. Its maximum length is 150 meters and reaches a height of 22 m and is partially covered with aluminum. Form was entered between existing buildings hotel and service of historicizing and modernist style. Undoubtedly, refers to the first structures designed in parametric digital spaces such as overlap the Great Court at the British Museum, London and the courtyard at the Smithsonian Hall (2004-2007) in Washington, designed by Norman Foster. These pioneering structure showed how to integrate space of historical features into new functional public use areas. They are like Leibniz wants, "strained to immaterial internal body program events" [3].

Analyzing the new Paris headquarters of the Path*é* Foundation (2006-2014), which was opened in 2014, you can ask about the ethical order of "the good continuation" which often determines the interference in the existing structure. The construction was preceded by the demolition of two buildings in one of the courtyards of the Paris XIII district. Since the mid-nineteenth century there was a theater which in 1900 was transformed into one of the first Paris cinema. Demolitions were necessary and slightly contributed to the reduction of the constraints arising from the specific nature of the irregular and narrow courtyard surrounded by the historic buildings. The design work that was given to the architect Renzo Piano abounded in the series of experiments (Figure 7a-b-c). The experiments took into account the heterogeneity of the existing buildings and made a soft and amorphous object.

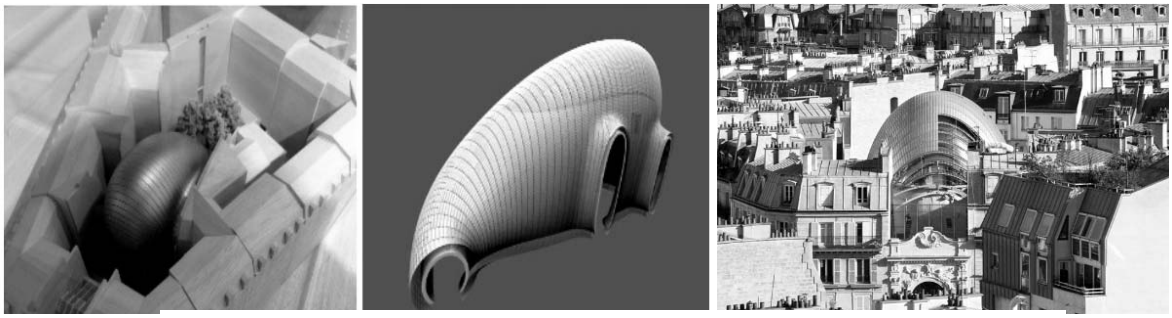

Figure 7a-b-c. Renzo Piano, The Path*é* Foundation, Paris, 2006-2014

The project initially was made in the Rhinoceros software from which a 3D model was exported to DXF 3D format, and then was imported to the Advance Design software in order to parametric model the complex geometry of the building coating. The headquarters of the Path*é* Foundation is energy efficient not only by the efficient use of sunlight, but also by the fact that premises are equipped with a system cross ventilation based on the night ventilation system (air conditioning is used only in the hottest days of the year). It should be emphasized that the geometric shape of the object, algorithmically generated by a computer, is important to forms and engineering calculations was determined by the function [13].

Parametric architecture implies that all elements of architecture are becoming parametrically malleable and thus adaptive to each other and to the context. Multiple systems are correlated with each other and with the environment. Without a doubt, parametric digital tools have extended the exploration field of solutions for architecture and engineering design attention to the environmentally efficient solutions forcing a different kind of behaviour. The adaptive potential of new forms especially in the existing tissue of cities can thus be placed not only in creating a higher level of behaviour but also in the area of user activity, residents or tourists. It can also provide new sensations and aesthetic inspiration. It is not just about the renovation, so that only overcome the erosion and recapitalization facility. It is important to give a new quality while conscious shaping of the mould.

4. Results and discussions

Now almost 20 years old, the digital turn in architecture has already gone through several stages and phases – from folding to cyberspace, nonlinearity and hypersurfaces, from versioning to scripting, emergence, information modelling and parametricism. We are witnessing a development of a new kind of tectonics expressing the structure potential through the advanced geometry and techno-logical capabilities, which puts in another, then ever before, light the tectonics' aspect in architecture. On the contrary, attempts of orchestration technologies are being made in order to develop the technological strategy of the unifying "old" material reality and "new" forms that build the twenty-first century cultural symbolism. They produce the new heterogeneous and interactive zones of human experience as the Kunsthaus in Graz, usually depicted and discussed object in the context of the role of the digital technologies and the new media in shaping architecture. Presented examples show other ways of

introducing the new spatial language in the context for urban tissue that correspond to the artistic consciousness and the attitude of information and digital technologies era. This is an ambitious project of ordering social processes in space because of each space is in fact a communication. All city spaces should resonate with each other because within network society all activities need to be networked and stay in continuous communication with each other.

5. Conclusions

At the second decade of 21st century the new shapes and forms are created by IT processes based on the concepts such as the topological space, the surface isomorphic, dynamic and animation systems, parametric design and genetic algorithms. Parametric architecture is the first global style for architecture, urbanism and the design disciplines since the crisis and demise of Modernism 35 years ago. It has recorded and interpreted the spirit of the times with vivid documentary precision, fostering and often anticipating crucial architectural and theoretical developments. It opened into the new territories for the study of the cognitive form, its tectonics and space, changing the existing axioms design. The new concept of the specialization of architecture is the equivalent of the democratization of the political system, the liberalization of the economy, among other examples.

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