Chapter 12

Blobitecture: Designing Unfamiliar out of the Familiar as a Contemporary Architectural Style

* Hidayet Softaoğlu

Introduction

This chapter investigates the meaning of blob that enables architects to design alien-like curvy, round-shaped or free forms by developing digital technologies. It explores the historical background of the blob architecture to evaluate and explain how digital architecture embodies nature, body, and environment even though blobs look like strange unknown entities. By the twenty-first century, the history of contemporary architecture has jumped into an unreversible era since the adaptation of technology into the design environment. 2D programmes allow designers to develop 3D programs that enable architects to create imaginable fluid, plastic, and organic forms. Today's rapid technology will enable people to practice out-of-world experiences using devices like V.R. and A.R. Artificial Intelligence helps architects and designers, along with unprofessional, design alien-like spaces anywhere, everywhere in the world or out of space, by using neural networks and computers. These robots produce digital spaces by using digital data and texts within seconds.

Consequently, the meaning of digital architecture has already changed from CADs, sketches, drawings, and modellings to combining and re-shuffling data to illustrate artificial intelligent spaces in robots like MidJourney, Dall-e, Runway, and Stable Diffusion. As all those robots run with texts, they demonstrate digital spaces through data-text combinations generated by users. Therefore, the digital spatial design of today links to data science, data collection, and texting spaces. However, architectural style in these programmes uses data collection where tons of architectural styles have been collected for years, so robots are mixing up and melting them into each other to present a combination of stored files rather than creating an original new style. Since technology quickly evolves, CADs, hand drawings and sketches are outdated, and the very early version of organic digital spaces has lost its status.
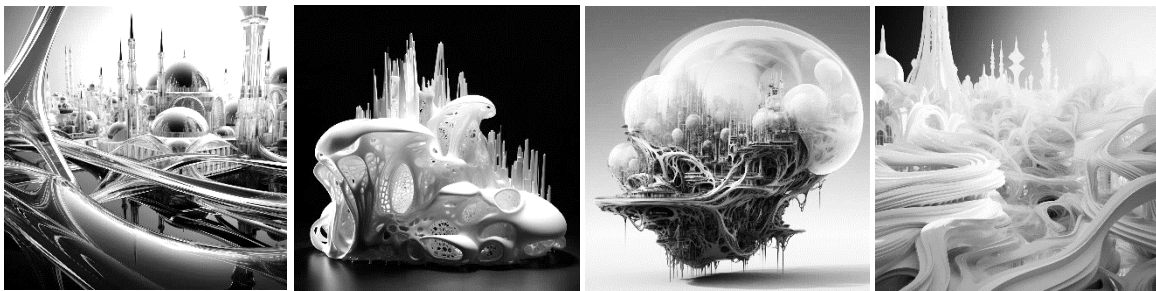
Figure 1. Glass Mosque, Cocoon City, Wood Tower, Suspended Cloud Garden, Paper Bridges (from left to right, author-produced in Midjourney bots, 2023).

Artificial intelligent robots can digitally illustrate unlimited spaces within described material, shapes, and structures, even though it is questionable in reality (Figure 1). Nevertheless, the development of digital spaces and their transformation into existence has a long history. Building technologies were limited by natural

Corresponding Author: * H. Softaoğlu
Alanya Alaaddin Keykubat University, Türkiye
e-mail: hidayet.softaoglu@alanya.edu.tr

material performance or manufactured from available materials. By technological developments, modern and complex substances with new characteristics let the range of possible design forms. Even though architects like Buckminster Fuller and Archigram trained geometries to get organic, rounded shapes in the mid-1900s, their buildings were still half-rigid and cornered, or hard to record and develop its drawing until the development of the digital software feature *metaball,* which allows architects to design biomorphic organic buildings. The term 'Blob architecture, blobmeister and blobitecture' was coined by Greg Lynn in 1995, and it has developed as a contemporary architectural style, and its examples are famous even today (Lynn, 1998). Today, blobitecture includes and inspires several variants: from the classic computer-generated blob to the investigation with original, sprawling shapes to combining deconstructive elements or parametric architecture. It confirms that the generic of digital space is not far from humans, nature, and the environment, although they look strange or alien-like.

Many buildings in strange and challenging forms should not be surprising as the ancestor of this alien-like space is a blob. Initially only used to describe organic, rounded objects, blob (binary large object) is one of the earliest digital architectural styles generated by inspirations from historical, cultural, and natural data that are rarely explained with its cultural and historical background. Since blob had already existed in nature before it was coined as a software feature, it is not surprising to discuss that history of architecture had witnessed the blob examples much before it was digitalised. This study historically investigates the meaning of blobs as natural architectural spaces and a blob as a digital architectural style (blobitectute). It also discusses that architecture in any strange forms or industrial systems can be similar and linked to a primitive lifestyle, human bodies, feelings and fears, or segments of nature.

Material and Methods

The Author is particularly interested in the relationship among history, technology, and nature in terms of the rapid development of digital architecture since blobitecture. Therefore, this study takes digitalism as a historical journey rather than an invention by the history-grounded theory approach. It scans and skims the history of humanity and designs or found objects to collect data about how our ancestors used blobs as spatial and functional spaces or entities, along with intentionally software-designed blob spaces and objects. Thus, visual data varies from things to interior or urban designs to discuss the interconnection between the concept of digital and primitive design. Are blob designs aliens or familiar to the human body and natural environment? What is the root of blob and blobitecture? Is it unfamiliar to the human body or not? These questions will be answered through examples in the history of architecture and design. First, the definition of blob will be explained linguistically. Then the form of blobs will be searched in different eras within its context and time, while the critical debate will be about how the idea of blob was growing even before the digital software term blob didn't exist. After that, the history of architecture will be revisited from prehistoric times to the contemporary era to see different blob examples from various periods to show whether architecture had embedded the blob versions for many years before it declared a digital parametric movement. It also examines the broader 'design' context within which the idea of the blob existed before it was terminologically introduced to architectural design.

Meaning of Blob: A Natural Shelter, Cultural Implant and Godlike Entity

A blob is "*a globule of liquid; small lump, drop, splotch, or daub*" (Gausa, 2003, p. 84). As the definition suggests that blobs have free-formed shapes so that they can be arbitrary, non-defined non-sharp, a blob can be anything and everything that is an organic, curvy, wobbly appearance. Therefore, a blob can be anywhere or perceived in many fields, especially design, including architecture, graphics, media, furniture, etc. However, in architecture, the critics have accused and apricated the blob. Postmodernist Charles Jenks complains and dislikes the style of the blob by saying, "those determined to capture the field with blob grammars and obtuse theories based on computer analogies" (Brookes, 2004, p. 15).

On the other hand, many critics respect coining the term "*blobitecture*" or "*blobmeister*" to support its importance in design history (Lynn, 1998). Blobitecture was "a new spirit in architecture" for designers like Greg Lynn, Eric Van Egerat and Kaas Oosterhuis from the mid-1900s till today. They practised around the idea in both 2-dimensional and 3-dimensional blob versions. Nevertheless, the blob was not originally an architectural movement, so blobitecture or blob in architecture was generated by the mid-1900s. Its revolutionary atmosphere does not mean that blob did not exist before. Therefore, in the history of humanity, the blob object was seen in various eras. Still, the blobitecture was because of time and technology in the world since the spirit of the age "zeitgeist" produced and motivated designers to think about a blob in architecture.

As commonly known that zeitgeist means "time spirit of the times" or "the spirit of the age", Georg Nilhelm F. Hegel first articulated a theory of zeitgeist in his book *Philosophy of History* (Hegel, 2007). According to his description, the zeitgeist is an instrument of the *absolute*, a kind of force *beyond the human's control* (Porter,

2004, p. 212). Therefore, it is a mechanism behind the dialectic of history. However, there is a relation between the zeitgeist and the development of the universal mind, so Hegel believes that the universal spirit can create, affect, and form their people and subjects related to them, such as religion, art, and architecture as it happened in the history of humanity and space around them.

A quick glimpse of history shows that, at the beginning of humanity, architecture supplied spaces to survive and protection from nature and threats or attacks from the outside. A cave or a shelter was enough for those who needed to hide from the sun, rain, animal, or enemy (Figure 2). Caves or rock shelters could naturally cover bodies with organic materials like rocks or natural stones. These ready-made found spaces hugged and embraced the human body as being one of the earliest blob architecture in its spirit of the time.

Figure 2. A Sketch to represent the primitive womb-like interior of a cave (Illustrated by the Author, 2023).

After realising that humans are physical and psychological subjects, architectural spaces began changing with this need for extra spaces for their activities, supplies and storage. Since water and food were the priority of human beings, some cultures were still nomadic and used primitive shelter systems in different geographies, like the Igloo of the Inuit people and the Huts of tribal people (Figure 3). Igloos were the first designed prehistoric temporary blobs and huts in which bushes were waved in curvy shapes to cover circler-planned houses. In both buildings, materials and structures were installed into the geography and the environments for camouflaging (protection), resistance and signalling to others that a specific group of people existed. Since Igloos are mostly made of ice or carved and squeezed snow, it was hard to differentiate where nature starts, or Igloo ends. Therefore, the structure naturally embraces the place it was curved, engraved or built on. Tribal Villages also seem adapted to their environment since huts were made of mud and bushes from the nature they installed. Similar to implants in the mouth, they embrace the land, climate, its neighbour and functions.
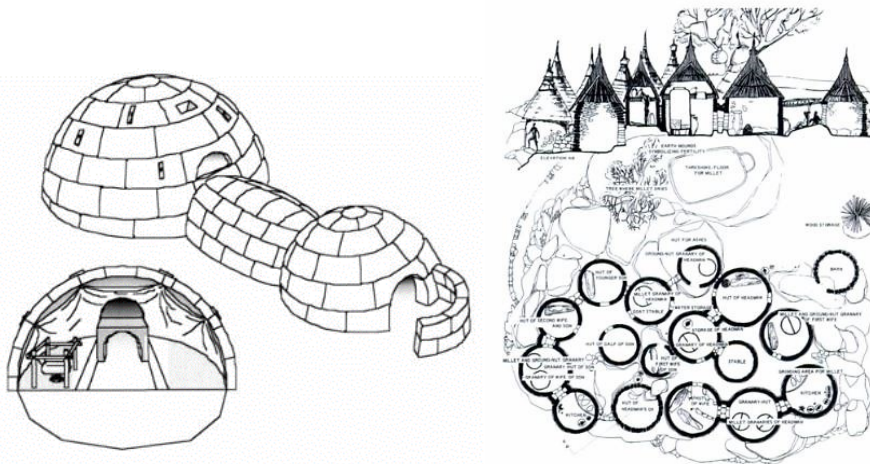
Figure 3. Igloo (left) snow dome house, the Matakam Huts of the Tribal village (right) circular plans (Pile, 2005, p. 16).

Human subjects were vulnerable to attacks from enemies, including other humans, animals, or natural disasters like storms, lightning, and floods. These physical and psychological gaps pushed people to believe in a god since they needed external poverty. Although they did not build comprehensive houses as we have today, they developed differently shaped founded objects to dedicate or give meanings to gods. Those objects were organic as they were ready-found objects from nature. So, they just collected and used to worship what they had. The time process and the scale of objects and spaces evolved and became remarkably huge as Stonehenge.

It was a challenge with gravity, and it was like a sculpture. It is not surprising to observe that shaping the environment and transforming, designing, or creating things are inherent in human nature.

In contrast to primitive shelters and caves, monuments like Stonehenge have specific geometry; in a circular plan, almost cornered cut stones describe post and lintel systems where one horizontal stone was put another to cover or pass the gap. The circularity in the plan can not be achieved in the section since the technology did not help them create a cave-like blobby enclosure system. Still, it proved that intelligent people wanted to present their knowledge of masonry and math.

Humans civilised parallel to their environment by discovering the earth, materials and source. New materials let people challenge the sky, an enemy and authority of fear in the past. As Hegel previously suggested, times created great and intelligent people who could design environments with new techniques, calculations, and mathematics from era to era. Stone in Egyptians, Greeks, and Romans were likely to differ from another; however, each of them differently organised their environment according to their material and technique. Developing arches and domes using concrete (*opus caementicium*) differs Romans from previous periods. After the primitive temporal domes of Igloos, discovering these aggregated mixtures could be considered a flame for designing permanent blobs in architecture. As arches and domes let architects span opening by using curves, they can be declared as early examples of the design of blobitecture based on digital calculation and techniques. Unsurprisingly, this earliest version of the blob is again associated with the gods as it was designed to cover the Pantheon (temple of all gods), one of the most famous domes in the history of architecture. Oculus, the sky window of the Pantheon's dome, let the audience see the sky associated with the gods, transferred into an architectural system by Gothic Architecture. Cathedrals were designed to reach the sky with new techniques like flying buttresses to deal with lateral forces. They carved stones as a sculpture, which was obviously like a relief or ornamentation but clearly was a supporting element. However, there was always observing, copying, understanding, and challenging nature and a fear of God and nature behind the attempt to create a new environment. Compared to caves or prehistoric monuments like Stonehenge, even though gothic cathedrals may seem to differ from nature with their pointed roofs, chimneys or angular plan scheme, there are still curvy and organic details in its interior end exteriors like ribbed cage structural system, floral windows made them blob-like.

With the industrial revolution, new technologies and materials produced new enthusiasts who wanted to experience new things in art, architecture, design, and engineering. Designers put their tendency and jargon, such as modernism, purism, rules, special orders, or ratios. Modern terms led to be refined, so they reduced ornamentation in buildings and stopped carving stones elaborately. In this modernist era, being a sculptor does not mean being ornamented. Modernist architects like Mies Van der Rohe designed spaces as if they were pieces of Platonic sculptures or objects. Therefore many modernists were quite distant to references to blobs except Le Corbusier. He differentiated himself from others since he was a master of cement. This ability seduced him to force the limit of plasticity in architecture and pushed him to transform his Ronchamp Chapel into a plastic sculpture-ic. His design was neither computer-aided nor a primitive hut or pre-found cave, even though it looks like both. However, modernists were not the only group in the early 20th century since it also produced its own antagonistic groups who, against the rigidity of modernism that appeared in Europe, called themselves Dadaists and Surrealists.

Blob in Dadaism and Surrealism: a Tension Among Scales, Function, Structure and Material

In Europe, certain groups who called themselves 'anti-modern' appeared and are today called "Dadaists and Surrealists". They were pretty opposed to modernism and any rules of it. Even the meaning of Dada was delivered from the first baby words, "da- da –da", which sounds random (Arnason, 2004, p. 242). Neither Dadaists nor Surrealists did not put any specific rules as same as modernists did. Dada destroys reasonable order by being "unreasoned order," so, understandably, they were rebels in art (Spretnak, 2014). Their primary intention was to do unplanned activities. Surrealism had similar features to Dadaism. Their influence was also on writers in the novelist; as Hans Arp said, "... Dada is for the senseless, which doesn't mean nonsense. Dada is for the senseless, like nature. Dada is for nature and against art. Dada is direct, like nature. Dada is for infinite sense and definite means" (Arp, 1942, p. 29). As it was mentioned before, nature has always played a significant role in forcing people to produce against or within itself, and it is not surprising that Dadaists returned to nature as a source of inspiration.

The role of nature can be read through the works of one of the well-known artists Jean H. Arp. He designed a wooden relief sculpture called Forest in 1916 with a biomorphic and organic form. According to his concept, many different layers are combined with *trees, leaves, and even cells of plants*, but it is "accidentally" shaped sculpture in his relief (Holt, Skov and Patton, 2005, p. 23). The work clearly represents a tension between the

layers because leaves and trees compete to take the lead role since, surprisingly, both are on the same scale (Figure 4).
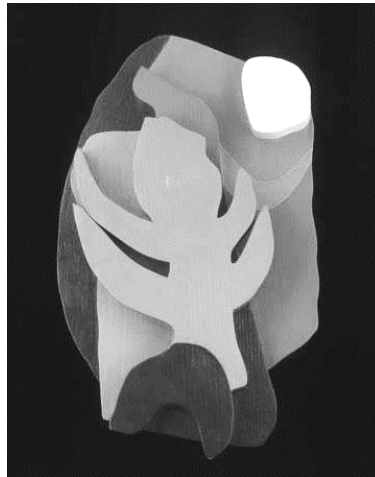

Figure 4. Jean Arp (Hans Arp) - *The Forest* (Holt, Skov and Patton, 2005).

The forest is one of the most famous blob designs whose organic form generated tension among *life, nature, people, or both*. This tension can also be found in Rosalind Krauss' *Optical Unconscious*, where surrealist paintings against specific modern rules were painted by extraordinary eyes (Krauss, 1996). These works represent everything in liquid-plastic. It explains how humans move in a fluid and plastic way; they differ themselves from the mechanic and certain or sharp movements of robots. Similarly, Siegfried Gideon also believes there is a connection between the human body's nature and surrealism since human movements are as fluid and looping as surrealist paintings (Holt, Skov and Patton, 2005). This fluidity can be followed in the works of Dali, where everything solid or rigid melts fluidly, even a clock that represents the rigidity of time.

Surrealists and Dadaists questioned and performed with the concept of nature, body, and movement since blob was a subjective situation that every human has in their bodies. This animal-kind nature of the blob inspired Al Capp to create the first 'blob' cartoon creature in August 1948 (Holt, Skov & Patton, 2005, p. 28). The character is called *Shmoo,* who behaves like an animal, can eat everything, give milk or lay eggs (Figure 5).

Shmoo did not specify any gender but showed various behaviour many humans and animals carry. It also symbolised the capitalist world and desires since it can die when looked at with hunger or transform into a cheesecake when looked at with love and happiness. Its lumpy blob body form was not threatening, and its reactions and behaviours to the number of situations only damaged itself. Subsequently, it was a safe and trustful character from the outside and inside. Consequently, *The Shmoo* got attention and many fans from the public and designers. Charles and Ray Eames designed a hard rubber plastic chair inspired by Shmoo called *la Chaise* while Eva Zeisel created glazed earthenware salt and pepper casters in 1946 (Figure 5); as new materials and techniques were available, like rubber, fibreglass, and porcelain, various forms and variations could be manufactured to represent flowing shapes.
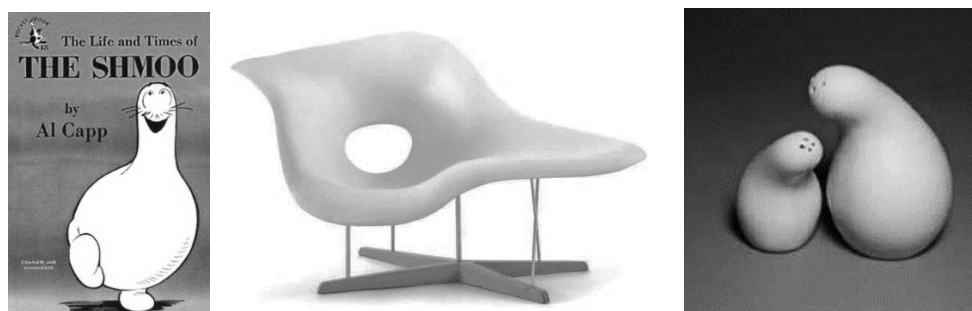
Figure 5. Shmoo (SHMOO, 2010), 'La Chaise' by Ray and Charles, (Holt, Skov and Patton, 2005) E. Zeisel Salt and Pepper Casters (from left to right) (Antonelli, 2003).

Initially, the blob was an accidental design, but scientific and mathematical approaches in architecture carefully developed it. Since biomorphic shapes that also stand for blobs can be found everywhere in nature, blobs triggered architects to look at nature as a source of biomorphic bodies to turn them into architectural designs. In the 1930s, Kiesler followed the surrealist artist's notion of fluidity and continuity and proposed Endless House. He proposed a single shell out of reinforced concrete with openings. The building includes several levels containing all the necessary spaces for a conventional house and unconventional rooms like a

seclusion chamber (Conant, 2015). His proposal was organic and fluid from the form outside; also, its interior was freely flowing from one room to another inside (Figure 6). Kiesler re-vised and re-designed prehistoric caves in different scales to surround and protect the body while enveloping the rooms. It was returning to the nature and understanding of human beings, who simultaneously need isolation, protection and socialisation.
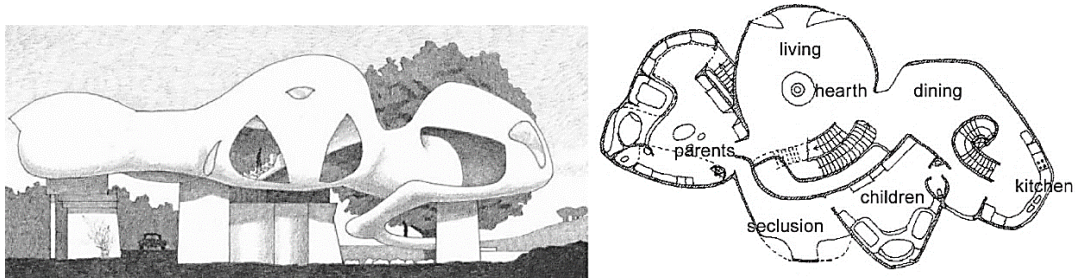
Figure 6. Kiesler Endless House elevation and main floor plan (Unvin, 2014).

Another early biomorphic & blob interior designer is Isamu Noguchi. He designed a ceiling for the American Stove Company–Magic Chef office building (1948) and used a *symbolic analogy with a rock garden* (Sullivan, 2022). Considering the earliest rock shelters and caves of prehistoric people, it is unsurprising to see the exact reference in Noguchi's works. He defined his style as '*edited accident',* and he says that "Everything was sculpture. Any material, any idea without hindrance born into space, I worked with driftwood, bones, paper, strings, cloth, shell, wire, wood, and plastics; and magnetite" (Noguchi, 1968, p. 26). His rare works are artificial cave ceilings elaborately designed to look fluidly curved and shaped by nature rather than hand-made (Figure 7). However, it also contains industrial and sculpture details that create tension with natural curves and sloppy or lumpy details. There is space within a space, cave-like details, small ponds and lakes and other entities anyone can find in a rock garden, and it is not a regular garden on the ground but suspended as a ceiling like a Biomorphic lunar landscape.


Figure 7. Isamu Noguchi Ceiling (Noguchi, 1968).

By the 1950s, blob's increasing popularity can also be seen through furniture designs. The blob was attractive and eye-pleasing for industrial designers since its organic shapes were accepted as an ergonomic approach in contrast to rigid geometry. The organic shapes of blobs embraced and hugged human bodies, giving the concept of comfort. One of these pieces of furniture is the *Egg Chair,* designed by Arne Jacobsen in 1958, which is an example of being womb-like hugging structure as opposed to a rigid geometric chair.

Blobmeister and Metaballs: Introduction to Digital Architecture

Parallel to Noguchi's belief that everything is sculpture, architects of the mid-20th century considered blob to have a potential for designing sculptural architecture. Thanks to collaboration with other disciplines who knew

complexity and chaos theory, biological sciences, string theory, and non-Euclidean spatial conceptions influenced designers who started developing architectural waves, folds, and blobs by advances in digital technologies. Architecture continues to evolve from the clean, angular forms of early twentieth-century modernism to the messy, blobular forms of the twenty-first century, and terms such as 'blobmeister' and 'biomimicry' have joined into design talk (Oats and Alfano, 2011). The spirit of time has slightly changed for plastic blob architecture as digital drawing techniques and computer aid design tools eased designing biomorphic architecture. One of digitalism's most influential tools is metaball, a breaking point for computational design. Jim Blind invented metaballs as 'organic-looking n-dimensional objects' and their calculation and technique in the early 1980s. He developed a computer graphic in which each *metaball* is defined as a function in *n*-dimensions[1]; also, the thresholding value is chosen to represent a solid volume. Metaballs can melt into n-dimensional iso-surfaces in close proximity to create single, contiguous, organic-looking objects. It is a particular type of sphere whose surface becomes visible when its density field reaches a predefined threshold value to create an iso-surface. When two metaballs are close to each other, their density field is combined to create a fusion (Goulekas, 2001, p. 312). Metaball is a system that lets designers create fluid surfaces by using spheres with different parameters. Due to the versatility of the tools, blob architecture is a type of curvy, wavy design without traditional symmetric form or edges (Figure 8).
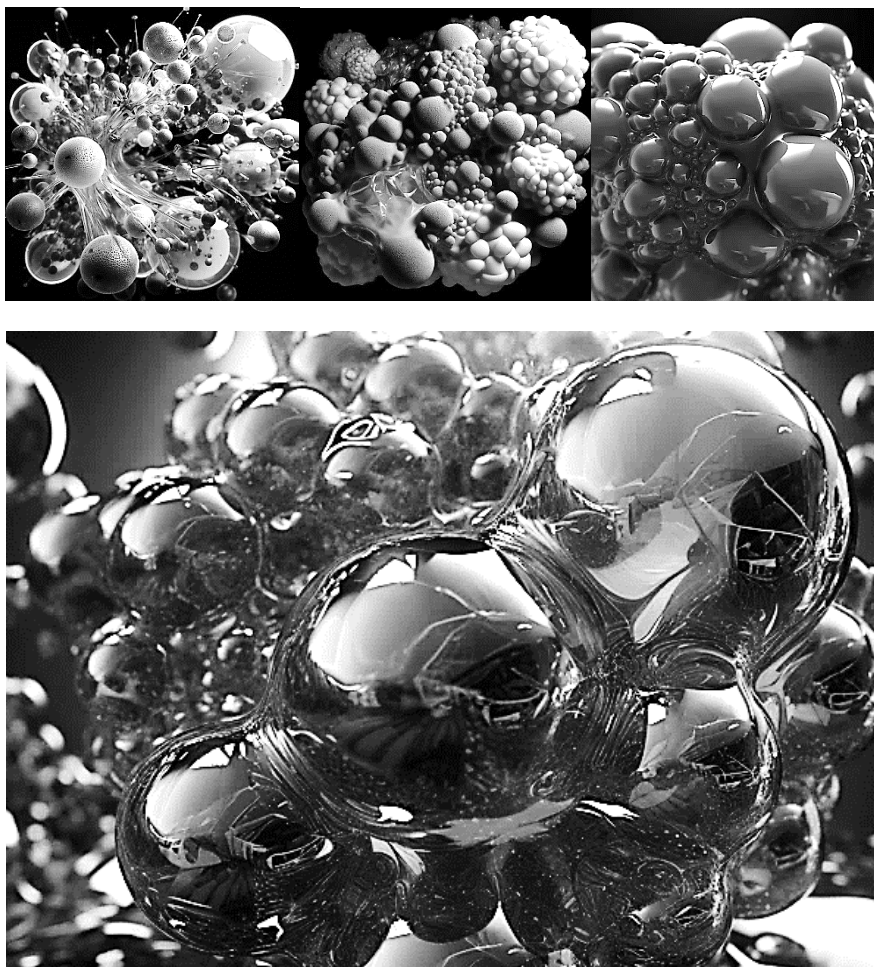
Figure 8. Metaballs and iso-surfaces among them (Illustrated by the Author, 2023).

This system has been grasped by blobitecture–architects since *metaballs* help to create fluid and homogeneous surfaces. Greg Lynn is one of the earliest architects who developed *metaball* in architecture with constructed theory on blob architecture. The term "Blob Architecture" was first used in 1995 by Greg Lynn to describe biomorphic buildings whose complex forms were created with the help of computers (Uffelen, 2016). Lynn says that "traditional architecture, the abstract space of design, is conceived as an ideal neutral space of Cartesian coordinates" (Lynn, 1998, p. 10). Lynn's theory linked to the fluidity in Dadaists and Surrealists, whose notion was against to rigidity of the Cartesian scheme. According to Lynn, architectural design differs

---

[1] for three dimensions, $f(x,y,z)$; three-dimensional metaballs tend to be most common, with two-dimensional implementations as well.

from designing an object since many restrictions and parameters cannot be changed as opposed to architecture. He believes one of the challenges in architecture is not resisting technology and the development to answer the need of the zeitgeist. Therefore he takes references from history, like the vaults of Gothic Catedral, and examines them to develop the style and mathematic behinds them. He describes blob as an acronym for Binary Large Object in which spheres can be collected to create larger composite forms. Thanks to geometry and, mathematics, physics theories, he could demonstrate and work on large-scale single surfaces out of many small components and add detailed elements to larger areas (Lynn, 1999)*.

Lynn contributed to the concept of the fold blending numerous forms in a plastic and elastic way without a centre (Lynn, 2004). In his article Blobs, Bodies, Folds; he followed the microorganisms and their organic forms to transfer them into the architectural realm as building or animated forms or terminologies (Lynn, 1999). Lynn and many architects trained in contemporary blob style, especially in the building enclosure system using *metaballs*. In 2003, Peter Cook and Colin Fournier collaborated to design Kunsthaus, Graz, which looks like a cucumber fell to earth, a space shuttle or a biomorphic cartoon character from outside (Cook, 2016). Located in a historical context, its relationship with the neighbourhood is respectful of urban planning and planning. It behaves like a part of a puzzle that only fits on this site.

From the urban scale, the building looks like an "*urban implant*". Even though it seems strange and the target of many critics, it still attacks people to come and see it as if it was a found object to worship and a holy religious place to pray in. As an implant, it uprooted itself into the city, and it gave a new identity to this city. Therefore, the function of the building is not only provided inside, but also the blob envelope provides another part as an attraction point from the outside. Architects Cook and his collaborator explained their concept that the museum aimed to have a *distinctive and highly idiosyncratic form* to expose an iconic image, such as Frank Gehry's Guggenheim Museum in Bilbao, and they add that "it adopts the self-effacing stance of the well serviced anonymous shed that inconspicuously services its string of successive tenant" (Kunsthaus Graz). The difference between Cook's Kunsthaus-Graz and Gehry's Guggenheim Museum is their structure and construction. Gehry believed the building could be supported by individual load-bearing systems that work independently, although Cook's Museum and its free form came from creating a whole unit blob (Cachola, 2001, p. 205). Thus, Cook and Fournier could achieve a continuous blob structure like Shmoo, water drop, and giggling jelly. As it is not specifically familiar and definable from the outside, Fournier defines it as 'the friendly alien' so no one can avoid visiting this building. It is an object, image, toy, or sculpture, but eventually, it is a building*.

Another iconic building is the Selfridges department store in Birmingham (Figure 9), designed by Future Systems in 2003. Along with having a rippling curvy shape on the exterior, it also was covered with fifteen thousand chromified aluminium discs that are also curvy. This iconic building is in the middle of Birmingham's city, surrounded by cast iron steel structured- Victorian style. Like Kunsthaus, Selfridges, within this opposition to its historical environment, looks like a microscopic cell and animate form that includes various architectural programmes like a playground of tourism-entertainment, shopping dining, and it is the face of industrial Birmingham. The Ceo of Selfridges notes that there is competition in the retail environment since many people already have everything they need. So the challenge is to give people something else- an experience, a smile- to provide them with an absolute service, and architecture are one of these faces (Holt, S. S., Skov, M. H. And Patton, 2005, p. 130). As he points out, architectural necessities in this era extend beyond having a shelter as the primitive man needed something unpredicted, surprisingly experimental.
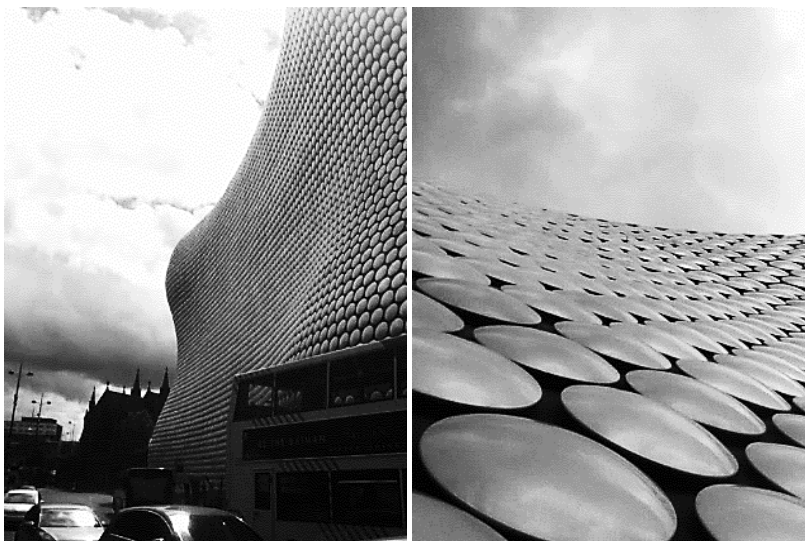
Figure 9. Exterior photos from Birmingham Selfridges (Photographed by the Author, 2015)

Discussion and Conclusion

This study visited different eras in human and architectural history to show that digital architecture is challenging to examine, understand and re-consider its biological and physical uniqueness within a new architectural frame. Since primitive architecture was already a piece of nature itself, it was already a biological and animated form similar to what Greg Lynn was searching for.

Table 1. Summary of blob references in the history of architecture (Developed by the Author, 2023)

Prehistoric Eras	Civilised Societies & Romans	Modernism/ Surrealism &Dadaism	Contemporary Era & 1st Digital Turn	Now
Primitive Architecture	**Eygypians & Greeks**	**Modernists**		
Caves, rock shelters ready-made womb-like architecture	geometry, mathematics, monumentalism, permanency, Post and lintel system, urban and city planning, socialising, trading, gods and sky	Platonic shapes, Reduction of curves and excessive details, Industrial material and transparency,	Microbiology, physics, mathematics, iso-surfaces, animate forms, technological systems, CADs, 2D and 3D drawings and modelling tools, collection of data, sending and receiving archives, The quick development of software and material-structural technologies, data science	Artificial Designs, 3D Print Technologies, Robots, Data as Designers and Data as Design, nature as data, human as data and blob...
Stonehenge: Monumentality, astronomy, mathematics and gravity		**Dadaism and Surrealism:** Experiment with body, nature and movement, Observing nature, the notion of Organic- fluid forms, interaction with biology, physics, science and technology		
	Roman concrete, Permanent plastic architecture, technological cities			
	Gothic: Reference from nature, challenging gravity Rose windows			
Reference of Blobs				
Carving snow and ice, forming muds as the earliest temporary blobs	**arches and domes, Rib vaults, Flying buttresses**	**Le Corbusier** & **plastic architecture, SHMOO, Blob industrial design, fluidity in plan and form, Kiesler**	**Metaballs Binary Large Object blobitecture, Greg Lynn folds, rounded surfaces, biomimicry, biomorphic architecture**	

Table 1 shows that the blob or its references existed from the prehistoric to the digital age. While primitive man used mud or snow to create cave-like structures to protect themselves, their supplies and their tribes from outside, they made organic lumpy blobby shelters with their technology and materials. Discovering Roman concrete eased designers to develop plasticity; arches or domes let them add curves to their construction while spanning wider openings.   Even though modern architects reduced the curves and appreciated the platonic shapes, they produced their opposite groups as Surrealists and Dadaists, whose ideology of fluidity and plastics

movements in nature opened a new perspective for the development of blob. They discover that everything in nature has a plastic harmony, and everything flows organically; what creates the difference is the scale among the subjects and objects. Therefore blob is in everything but in different scales. They considered the environment with different scales, from microscopic to urban, creating interaction among people from multi-disciplines. Since then, building biomorphic fluid shapes by developing materials and software has been more effortless because of the discovery and development of metaballs. Since rocks, gravels, or sands, are early ancestors and inspiration sources of metaballs, it is not an unfamiliar invention. A blob can be a virus in bodies or the thumbs, organs, or cells before their data are processed and transferred into a building design.

This study exemplified that the history of digital design until artificial intelligence was a long process that embraces history, time, technology, material, culture, belief, topography, topology, collaborations, cooperations, examinations and many others. Blob is only an example to show that one of the missions of architects is to deal with nature and technology to compete with gravity by combining math and calculation. The early 21st century was crucial for digital architecture since computer-aided programmes boosted architectural design and enabled architects to design more plastic spaces. Therefore, the years between 1992-2012 are called the first digital turn (Carpo, 2013). With the evolution of computer aid design, followed by other software, designers can not push the borders and limits of designs. Today, we are experiencing the second digital turn. A.I. slightly takes the lead role of architects since many bots rapidly illustrate text-based described spaces within uncountable amounts in seconds. There is also depth-map software adding depth and transforming these 2D spaces into 3D to send it to 3D printers. Unsurprisingly, architecture will be produced by only data with less or no human labour within a couple of years. As human architects and visioners are now slowly replaced by robots, this study end by questioning what artificial intelligence will bring to the design environment and educational system.

Acknowledgement

Conflict of Interests

The Author declares no conflict of interest.

References

Arp, J. H. (1942). *Abstract Art, Concrete Art*, Reproduced in Peggy Guggenheim, Art of this Century. Art of This Century and Art Aid Corporation.

Antonelli, P. (2003). *Objects of Design from The Museum of Modern Art*. Museum of Modern Art. ISBN: 0-87070-696-9

Arnason, H. H. (2004). *History of Modern Art: Painting, Sculpture, Architecture, Photography*. Prentice Hall. ISBN: 9780131840690

Brookes, A. (2004). *Blob Architecture (Blobmeister). Archispeak: an illustrated guide to architectural terms.* Spon. ISBN: 9780415300124

Cachola S.P. (2001). *Digital/real: blobmeister, erste gebaute projekte.* Birkhauser Verlag. ISBN: 3764365722

Carpo, M. (2013). *The Digital Turn in Architecture 1992-2012.* Wiley &Son. ISBN: 978-1-119-95175-9

Conant,   H.   (1968). Frederick   Kiesler, *Inside   the   Endless   House*, Art Journal, 27:4, 444. doi: 10.1080/00043249.1968.10793866

Cook, P. (2016). *Architecture Workbook: Design Through Motive*. Wiley. ISBN: 978-1-118-96519-1

Gausa, M. (2003*). The Metapolis Dictionary of Advanced Architecture: City, Technology and Society in the Information Age*. Actar. ISBN: English 9788495951229

Goulekas, K. (2002). *Visual Effects in a Digital World: A Comprehensive Glossary of Over 7000 Visual Effects Terms*. Elsevier Science. ISBN-10: 0122937856

Hegel, G. W. F. (2007). *Philosophy of History.* Cosimo Classics. ISBN-10: 1602064385

Holt, S. S., Skov, M. H. & Patton, P. (Eds). (2005). *Blobjects and Beyond: The New Fluidity in Design*. Chronicle Books. ISBN: 0-8118-4765-9

Krauss, R. K. (1996). *The Optical Unconscious.* M.I.T. Press. ISBN: 9780262611053

Kunsthaus   Graz.   *Design,   Renderings*   [online].   Retrieved   from: http://www.museum-joanneum.at/en/kunsthaus/the_building/design_renderings. [Accessed 16/11/2022].

Lynn, G. (1998). *Folds, Bodies, Blobs*. La Lettre volée. ISBN: 9782873170684

Lynn,   G.   (1999).   *Animate   form*.   Princeton   Architectural   Press.   ISBN:
        9781568980836

Noguchi,   I.   (1968).   *A   Sculptor's   World*.   Harper   &   Row   Publishers.   OCLC:
        637455163

Oats, E. & Alfano, M. (Eds.). (2011). Decoding Theoryspeak: An Illustrated Guide to Architectural Theory.
        Routledge. ISBN: 9780203841907

Pile, J. F. (2005). *A History of Interior Design*. Laurance King Publishing.

Porter,   T.   (2004).   *Archispeak: an   illustrated   guide   to   architectural   terms*.   Spon.   ISBN:
        9780415300117

SHMOO. (2010) [online]. Retrieved from: http://www.lil-abner.com/shmoo.html. [Accessed 16/11/2022].

Spretnak, C. (2014). *The Spiritual Dynamic in Modern Art: Art History Re-considered, 1800 to the Present*.
        Palgrave Macmillan. ISBN-10: 1137350032

Sullivan, M. R. (2022). *Alloys: American Sculpture and Architecture at Midcentury*. Princeton University Press.
        ISBN: 9780691215778

Uffelen, C. V. (2016). Blob! Round Shapes, Fluid Forms. Braun. ISBN 978-3-03768-201-2

Unwin,   S.   (2014).   Twenty-Five   Buildings   Every   Architect   Should   Understand.   Routledge.   doi:
        10.4324/9781315732459-1