JORGE PALACIOS
Paradoxes of Cognitive Constructs: Physics as Language

Palacios' interests focus on exploring the mental constructions we create to represent abstract ideas or phenomena. He delves into how, through these constructs, we process information from the world, verify it, and question it—particularly when our perceptions come into apparent contradiction with our learned experience.

He concentrates on investigating abstract elements and sensations that, although universally recognizable, lack an attributed morphology. The artist postures, "What would be the shape of abstract concepts such as inertia, balance, velocity, gravity, magnetism, electricity, sound, light, or time?"

His reflections on visual semantics translate into the materialization of sculptures, for which the viewer plays a fundamental role. From the response of the observer, the artist asks if his work can be interpreted through some common pattern, and whether the laws or principles of physics can serve as a channel to find a universal visual language.

Palacios' work plays with the psychology of perception, confronting intuition with reason and investigating cognitive paradoxes. He explains, "As a sculptor, I have studied the specific curves that fluid dynamics generate in nature. I have explored them through other materials that are neither liquid nor gaseous, which has helped me to create sculptural oxymorons, or visual paradoxes, based on collective empirical knowledge and the inherent behavior attributed to said morphologies."

Palacios remembers with special emotion an anecdote that occurred during his solo exhibition *Jorge Palacios at The Noguchi Museum*. Numerous sculptures were exhibited throughout a large part of the galleries of the museum's permanent collection and the sculpture garden, in dialogue with the pieces of the master Isamu Noguchi.

> In the words of Palacios, "One of the sculptures on view, *Flowing Drop*, was inspired by the Pitch Drop experiment, the longest-running lab experiment in science history, initiated by Thomas Parnell in 1927 at the University of Queensland, Australia. This experiment consisted of a glass funnel with a significant piece of pitch, a derivative of tar, that over the years, would show its behavior as a fluid element. The objective of this experiment was for a drop of pitch to precipitate through the glass funnel into a small container located below. A process that took approximately 8 years to complete for each of the drops and that served to show that pitch, which is seen as a solid, actually behaves like an extraordinarily viscous liquid at room temperature, the world's thickest known fluid and slowest moving liquid on the planet."

Palacios has been working under the premise that the human brain has the unconscious ability to recognize certain morphologies and intuitively attribute specific patterns or behaviors to them. In this context, the sculpture was inspired by the experiment; A 5-foot ebony sculpture installed in one of the corners of the museum's exhibition space, which could be described morphologically as a large teardrop, that ran along the entire internal edge of the space. The visual tension generated by the piece, when suspended 1 foot from the ground, encouraged viewers to irrationally imagine its movement.

The artist had a brief conversation with a visitor, who stopped in front of the piece for a long period of time, and told Palacios that he was waiting for the drop to fall. This response was intriguing and also highly comforting for Palacios as a sculptor. The piece of wood, without any elastic capacity, made the visitor experience a suggested movement that had prevailed over his logical reasoning, illustrating the power of morphology to challenge visual perception. The closest scientific term that we could attribute to this transposition of sensations from one object to another would be visual synesthesia. Palacios comments:

> "The work of confronting intuition with reason and exploring the limits of visual semantics are the foundation of my research and the driving force of my creativity."

If we were to ask a neurologist, they would say that Palacios is foremost interested in how the mental and cognitive processes related to the interpretation and organization of the sensory stimuli we perceive are developed, especially the gap between immediate intuitive perception and rationalization and conscious interpretation.

Jorge Palacios investigates cognitive paradoxes. Some of them could be a suggested movement or a balance at rest, generating the illusion of movement or dynamism despite remaining in a static physical state, as well as a weightless movement, transcending the apparent limitations of matter and static, in the same way as the processes involved in an anamorphosis as it was of interest for Maurits Cornelis Escher.

Some of the sculptures presented in the exhibition are used as a static vehicle to examine fluidity and movement—the same notions that Harold Edgerton researched using static photographs. Pushing these observations further, Palacios uses the laws of physics to delve into how clearly rigid and solid materials can appear to possess liquid and ethereal qualities. His work is a testament to his deep knowledge of material behavior, not only about materials he physically sculpts or models, but also those he suggests he is working with, such as gasses and liquids.

As Palacios has said in countless interviews, "We don't have to understand something in order to feel it, but we should understand it to express it." Palacios focuses on understanding how the limits of universal physics condition the design of nature. To delve into this process of understanding Palacios, we must explore in-depth the laws of physics that support the behavior of the morphologies that inspire him.

Palacios investigates the field of rheology, to analyze the fluidity and deformation of matter, particularly materials that have both solid and liquid properties, delving into granular materials, viscous liquids, and elastic solids. For instance, exploring how solids, such as snow, sand or volcanic magma, can exhibit fluid behaviors under certain circumstances due to the influence of gravity, pressure, humidity, temperature or viscosity.

A source of reflection for the artist has been to analyze the morphology of phenomena such as desert dunes, whose behavior resembles that of fluid in certain conditions under the mechanics of granular media. In it, the forces of friction, pressure, and compaction between the particles play a fundamental role, due to the effect of gravity, and the formation of a specific angle of repose in which the sand particles can remain in equilibrium without collapsing.

When studying the morphology of dunes and, in particular, their crests and curves, environmental agents modify, through their forces, the topology and morphology of a granular accumulation. In a sterile space, they would form a pure cone, but in a context where meteorological and environmental

phenomena act, these phenomena turn into the true sculptors of their morphology. Consequently, we could say that the way the air moves, its behavior, direction, and force ultimately determine the shape of the dune, which is studied through fluid mechanics.

Just as we saw in the case of dunes, if we study the melting of ice in a laboratory and compare it with the melting of ice in an environment in which environmental agents act, we can see how the flow of air, displacements of heat and cold masses, together with the intrinsic behavior of ice studied by glaciology, determine the sinuous curves that constitute the morphology of the glacier, drawing our attention again to the fluid mechanics that determine the movement of air and wind.

It has undoubtedly been through fluid mechanics, especially fluid dynamics, from which Palacios has explored how liquid volumes and gases flow and adopt particular shapes in response to pressure or gravity:

> “Only by understanding, as a sculptor, what are the specific curves that fluid dynamics generate in nature, and recreating them through other materials that are neither liquid nor gaseous, is how I have played at creating sculptural oxymorons or visual paradoxes based on collective empirical knowledge and the inherent behavior attributed to said morphologies.”

One of the most stimulating physical characteristics for Jorge Palacios in surface physics and fluid physics is surface tension, that curious tendency of the molecules on the surface of a liquid to be more strongly attracted to each other than to the molecules inside the liquid itself, which generates a "film" on the surface that acts as an elastic membrane that resists deformation.

Palacios has studied what is the curvature that we identify as a drop of water stopped on a hydrophobic surface or the morphology that we recognize as a fluid element, for example, in the movement of attraction of two drops of mercury that merge into one due to the attraction caused by gravity and surface tension.
The pioneering research of George Gabriel Stokes into the theory of viscoelasticity can also intervene in this process of fluid movement, which considers viscosity as a fundamental property of fluids, expressed in the internal resistance of a fluid to flow.

If we were talking about the movement of fluids, aerodynamics and hydrodynamics deal with how fluids, air, and other gases move, based on the Navier-Stokes equations, which help us understand how a wide range of fluid dynamic phenomena behave, but also to understand why nature, in the search for energy efficiency, has designed the dragonfly, the shark or the manta ray.

Palacios is especially interested in the process of simplification and synthesis of morphologies that show how evolution acts as a "designer" through natural selection in its search for efficiency and in how nature has developed ways to reduce the resistance of the air and fluids. In this case, as elements move through these media, which often results in highly specialized and efficient designs for a specific function, whether we are talking about the morphology of a red blood cell, which must move agilely and efficiently through the blood vessels, or the movement of a jellyfish in the water.

Palacios studies this simplification and synthesis of nature with the aim of creating more synthesized visual semantics in the constructs on which he reflects.

In the search for the origin of nature's morphologies, for Palacios' practice, it has been highly motivating to study Newton's fundamental laws of classical mechanics and find some forms in common. The shape and movement of water flowing through a sinkhole, where the water rotates in a circular pattern, the form of a tornado, where air moves in an upward rotating spiral, and the morphology of a galaxy, where stars and gas rotate around a common center due to gravity, are all examples of rotational motion phenomena. Regardless of their medium, they all surprisingly share a common morphology, from the microscopic to the astronomical scale.
These concepts, along with others such as the Law of Inertia, or the tendency of objects to resist changes in their state of movement, have inspired many of Palacios' sculptures.

In Palacios' search for understanding the morphologies and geometries of nature, he is also interested in many other aspects of physics. In the same way that Dalí was interested in intra-atomic worlds, Palacios is interested in concepts from astrophysics, such as Higgs theory and string theory. Just as Berenice Abbott was interested in the physics involved in the behavior of magnetism, in the same way, Palacios is interested in the propagation of waves according to George Gabriel Stokes or the research work of Nikola Tesla in relation to the behavior of electricity. All of them have raised very meaningful reflections for Palacios in the construction of his constructs that have materialized in some of his most characteristic works. Some sculptures reflect on more academic concepts, such as what shape dark matter would have if it had a known shape or gravitational singularities. Other sculptures work on more common concepts, but without attributed morphology, such as magnetism, electricity, sound, light, or time.

Following the wake of the contributions of Buckminster Fuller and his integral geometry system Synergetics, Palacios works with the geometries of the Bézier curve and lift and drag curves, as well as explores and deepens the concept of nature's curves. These nature’s curves, although they cannot be expressed through the accuracy of geometry or the precision of a mathematical formula, require a global understanding of the underlying principles of physics. Surprisingly, intuitively or instinctively, there is something about these curves that makes us all identify them as organic curves. In the words of Palacios:

> “Perhaps the use of organic morphologies can arouse a certain empathy in the viewer.”