Hungarian University of Fine Arts Doctoral School

Observing the cosmos through space and time – the art of perception

DLA Dissertation Theses

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In my doctoral research, I investigated the process, across various civilizations, of understanding and comprehending the Universe, with a focus on attempts to uncover the relationship between space and time.
I was interested in the insights that made the cosmic correlation between these concepts increasingly evident to us, while simultaneously revealing the complexity and scale of the true nature of space and time.

As an artist, beyond the scientific discoveries and the ideas underpinning them, I have been primarily concerned with how we can personally come closer to the experiences of the individuals who formulated these ideas. These experiences arise from different forms of perception, and I have sought to explore how they could be made directly accessible to us in some way.

The process through which humans have succeeded in decoding certain aspects of the functioning of the Universe takes us back to the dawn of humanity, when we used massive stone structures to try to record the cycles of our central celestial body, the Sun, and its companion, the Moon. With these, we not only managed to grasp and define the dimension of time but also began to discern the structure of cosmic space.

Through ongoing discoveries, we have reached the limits of knowability with our most advanced detectors. We have managed to detect signs of the Universe's birth and have encountered celestial objects nearly as old as itself.

Gradually, it has become clear that relativity is far more prevalent in the Universe than previously assumed. This very realization—the inherent relativity in everything—unveiled the all-encompassing relationship between space and time.
Although we rarely experience this in our daily lives, these laws invisibly and fundamentally govern our existence. Our navigational satellites continuously correct the bending of time based on the theory of relativity, at a speed imperceptible to human senses, thereby maintaining virtual coordinates on Earth fixed. Without this, we would drift further from our actual location on digital maps each day.

However, to reach this point, it was not enough to merely develop our tools; we also needed people capable of recognizing previously unseen

connections and unafraid to share them, even if it meant challenging the prevailing worldview of the time.
Often, these very insights led to the creation of instruments and experiments that could verify these findings.

These astronomical, navigational, and time-measuring instruments are crucial both to my dissertation and to my doctoral work. Their construction and operation follow certain aspects of the Universe's architecture, either attempting to imitate or correct them. As a result, by studying these tools alone, we can come closer to understanding how the cosmic system works. These instruments are essentially like annotations between the lines of the Universe's code: they reveal the structure of parts of the program.

Yet, it becomes entirely evident under the starry sky how elemental the direct experience of the cosmos and its phenomena really is. These subjective perceptions have given birth to new ideas that have helped to better understand the structure of the Universe.

During my doctoral research, I actively engaged in creating solargraphy images to capture the essence of earthly time—time as graspable to human perception—through the movement of the Earth and the Sun. The images I produced depict certain spatial and temporal aspects of our cosmic journey through the light-drawn path of our star.
In my experiments, I developed new procedures and designed specialized cameras to gain a deeper understanding of the relationship between space and time and its direct experience.

The characteristics of the Sun's path fundamentally determine the alternation of days and seasons, while—in the knowledge of time—also mark the location of observation and the position of our planet within the solar system. These connections are vividly brought to life by land art projects in the United States that focus on the functioning of the cosmos by marking the extreme points of the Sun's path.
At the same time, these distinctive features of the Sun's celestial path can also deceive our sense of time. It was through experiencing this latter phenomenon that I gained a deeper understanding of the spatial and temporal relationships of our cosmic position, which is the primary focus of my research.

My doctoral work is a collection of pieces through which I aimed to vividly convey the experiences and insights that emerged at the conclusion of my research.
I created light installations that examine the relationship between space and time from different perspectives, representing some of the hypotheses from my dissertation.
Through the new installations presented at my solo exhibition in Székesfehérvár, I explored our continuous movement through the space of the Universe, the distancing of larger cosmic object groups from each other, our movement within our galaxy and solar system, as well as the curvature of spacetime.
With the last piece of my doctoral work, my latest light installation, I sought to explore how we might get a glimpse of the conditions beyond the event horizon inside a black hole.