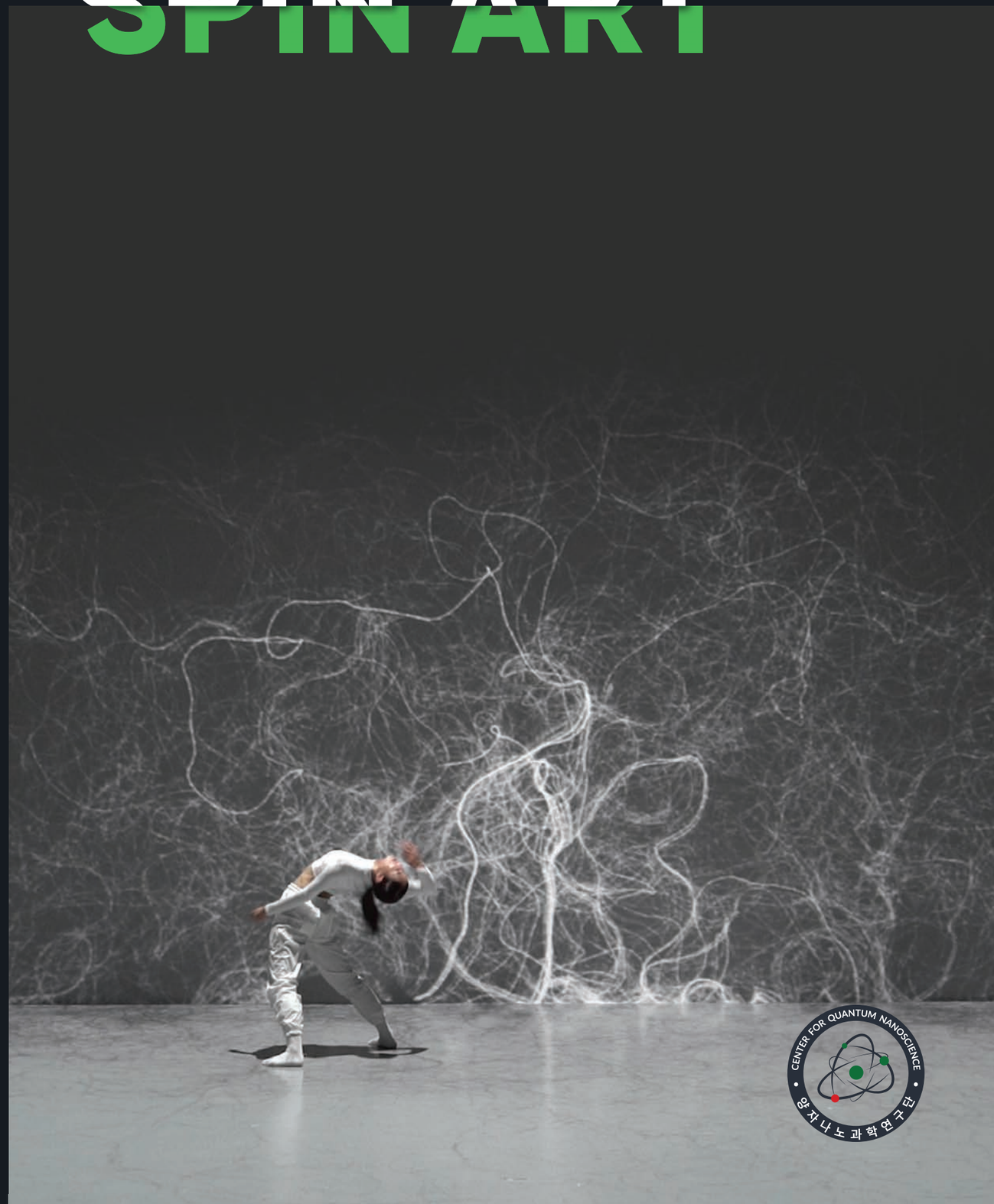
Art Contest 2021

SPIN ART



Website
qns.science/spinart-en

Social Media
Follow us on: @QNSscience

Host
IBS Center for Quantum Nanoscience
at Ewha Womans University

Special recognition to QNS outreach manager Sunny Kim.
Thank you for your extraordinary leadership.

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Director's Greeting

The SPIN ART contest started with a question, “How can we share the beauty of quantum with the world?” Our center explores the quantum world every day. We find it fascinating and believe that non-scientists can feel the same excitement. We reached out to the art community hoping they can ignite this passion by expressing their own interpretations of quantum.

Artists are experts in transforming unseen ideas into visual artwork. With the artists' magic, the audience can understand previously unknown concepts through their eyes and ears. This is the reason why artists push the frontiers of introducing new philosophies to the world. In this contest, the participants were able to express their understanding of quantum and spin in their voices.

We enjoyed engaging with the art community while hosting the contest. Jinkyung Kim, a QNS student, wrote a beautiful article introducing the quantum spin's properties in a metaphor of René Magritte's artwork (you can read this for yourself on page 6). She also gave a great talk about it for the contest participants. One of the audience members said that, before the talk, she barely had any knowledge of quantum but now got a new perspective of how to look at the world. She also said that the artistic metaphors gave her clear inspiration. Another QNS student Kyungju Noh, created a great educational comic of Spin introducing the quantum world he lives in. This comic became quite popular on QNS's social media (you can find this on page 8).

Sunny Kim, QNS's Outreach Manager, created a bridge between QNS and the art community throughout this contest. Over 250 artists participated with 7 artworks selected by our panel of judges for prizes. Now we are inviting the general public to cross this bridge. We hope that the artworks inspire the public to find the beauty of quantum spin.

Andreas Heinrich
Director, Center for Quantum Nanoscience

About QNS

The Center for Quantum Nanoscience, on the campus of Ewha Womans University in Seoul, South Korea, is a world-leading research center merging quantum and nanoscience to engineer the quantum future through basic research. Backed by Korea's Institute for Basic Science, which was founded in 2011, the Center for Quantum Nanoscience draws on decades of QNS Director Andreas Heinrich's (A Boy and His Atom, IBM, 2013) scientific leadership to lay the foundation for future technology by exploring the use of quantum behavior atom-by-atom on surfaces with highest precision.

QNS at Glance

75 Publications

2 Control Rooms

14k *per year* Visitors on our Website

8 Key Instrumentations: ESR-STMs; SE-ESR; AFM, etc

80k Views on our Youtube

13 International Awards

8 STM Labs with Lowest Vibration Level

17 International Events

55% of Researchers are Female

5 *years old* 2017-2021

244 International Visitors (2 years of COVID-19)

46 QNS Members

30+ International and Domestic Collaborations

SPIN ART at Glance

Subject: Spin and/or Quantum

Spin lives in a tiny world that is even smaller than an atom. Amazing things happen there. The participants used their imagination to express the quantum world!

Outline

- **Contest kick-off talk**
  Date: June 1st 2021
  Speaker: Jinkyung Kim (QNS)
  Title: Finding "Spin" in René Magritte's Work
  60 artists attended via Zoom
- **First round: 250 artists submitted their artwork**
- **Final round: shortlist of 40 artworks competing**
- **Exhibition**
  Location: QNS, Research Cooperation Building at Ewha Womans University, Seoul, Korea
  Winners artwork: From October 2021 to October 2023
  Final round artwork: From October to December 2021

Prizes

QNS Director's Prize	3,000,000 KRW	One Prize
Second Prize	2,000,000 KRW	Three Prizes
Third Prize	1,000,000 KRW	Three Prizes
Spin Streamer YouTube Prize	2,000,000 KRW	One Prize

Website
qns.science/spinart-en

Host
IBS Center for Quantum Nanoscience at Ewha Womans University

Spin that is Opening Up New Doors

Many things that are named as being a part of the 'contemporary era' are indeed unstable, but the scientific and artistic journey to map out a new constellation is continuing endlessly. Arthur Clarke once said, "Any sufficiently advanced technology is indistinguishable from magic". As such, in the midst of rapidly changing social and technological innovation, our imagination is realized through art and science. If the encounter of early stage art and science was a pure creator-type realization that was without discipline and hierarchy, that of the contemporary era is interconnected in a more granular manner. Science is no longer just a tool for creation, and it is seeking to converge the semantic horizon after having transcended the technological platform.

Due to COVID 19, pandemic has become part of our lives, which was unimaginable before. In such a time, science and art has become an even more dire hope and key to us who can no longer live tomorrow as we had done so yesterday. Would it not be the case that new possibilities would rise from the connecting points of science that is the driving engine for the future and art of communication that transcends time and space?

I was able to view artworks that were expansions and transitions of the extended form of existing works under the common theme of 'Spin Art' in this contest. It was especially interesting that the experimental form stood out from the media perspective. These artworks encompassed various genres and conveyed interpretation of the world in a self-mocking manner, covering personal experience, narratives, interests, and even aesthetic and social issues. To an artist, creation is a method and attitude for building a relationship with the society and a process to prove oneself. The world would, then, acquire depth through the existence of such artists. I hope that the spin of artists, who question all things tangible and intangible as Heisenberg and Einstein had done in the past, will act as the power to open up the doors to a new world.

Alice Woo (Curator, Daejeon Museum of Art)

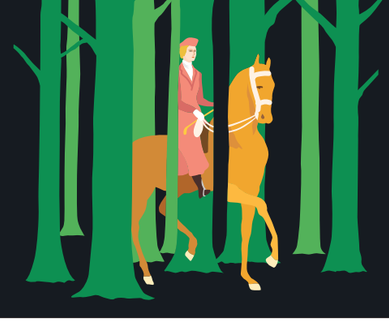
Evaluation Panel

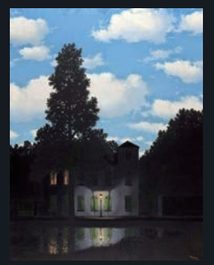
Alice Woo (Curator, Daejeon Museum of Art)
Youngmi Shin (Artist)
Cho Sang (Professor, Seoul Institute of the Arts)
Juyong Park (Professor, KAIST)
Paul Thomas (Professor, University of New South Wales Art & Design)
Jinkyung Kim (Doctoral Candidate, QNS)
Andreas Heinrich (Director, QNS)

2021 SPIN ART QNS ART CONTEST

Finding “Spin” in René Magritte's Work

Author: Jinkyung Kim
IBS Center for Quantum Nanoscience, Ewha Womans University Doctoral Candidate



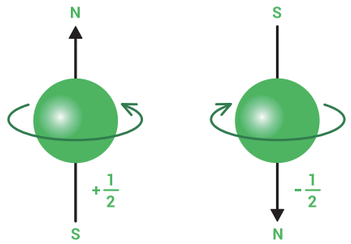


René Magritte <The Empire of Light> (1954)

René Magritte <The Human Condition 2> (1935)

René Magritte <The Hesitation Waltz> (1950)

The topic of this “Spin Art” art contest is the spin in quantum mechanics. Quantum mechanics is an academic study that deals with a world that is even smaller than the atoms. Atoms and molecules make up all matter on earth. Sometimes, surreal things happen in such a small world. Among those, there is the concept of spin. Spin has unique properties, including “discontinuity,” “superposition,” and “entanglement.” We are holding a contest to artistically express these characteristics. The characteristic of spin has been explained below by comparing it to the work of the Surrealist artist René Magritte, to enhance general understanding of artists who communicate with visual language. (It may be unrelated to the original intentions of René Magritte).



Mimetic diagram of spin that is generally used. Characteristics (energy state, expressed as +½ or -½) vary depending on whether the spin is up or down. At this point, the spin axis and spin orientation are the opposite.

Hello! I am Spin and I live in a world dominated by quantum mechanics. I am a physical quantity that determines the magnetic properties of particles. A physical quantity is a ‘value’ like mass or speed. Thanks to me, particles such as electrons and neutrons behave as very small magnets because the magnetic property of an object changes depending on my state.
People call me spin because they believe that I exist when a particle “spins” around a single axis. People compare me to our earth as it rotates around its own axis, an imaginary line running through the North and South Poles. However, I only exist in places that are much smaller than the earth. If you imagine the earth to be as small as an apple, the world I live in would be as small as shrinking the apple placed on the earth by the ratio of earth to apple.
Many unusual things that you cannot see in the normal world happen in such a small world. It is almost comparable to a world illustrated in the works of a Surrealist artist, who took great interest in exploring dreams and the unconscious mind. I would like to introduce myself through the works of René Magritte, a Surrealist artist.

Discontinuity: Maybe the World Moves the Way the Second Hand of a Clock Moves

René Magritte <Le blanc-seing> (1965)

If we look carefully at René Magritte’s “Le blanc-seing”, we can see that some parts of the woman who is riding a horse have been cut off. Generally, when we imagine a woman riding a horse, we imagine the shape to be fully connected throughout. Similarly, in a world that people live in, various values such as mass or speed exist continuously. However, in a world that is as small as a particle, physical quantities such as spin, exist in discontinuity as shown in the picture.
Magritte intentionally cut the image when painting it. In a particle world, some values such as energy exist in a discontinuous manner under the law of nature, like this painting. The concept of having a lump sum that cannot be divided and has discontinuity is called ‘quantization’.
The energy of particles is quantized in a very small world. This means that it is only possible to choose energy values that were already determined. To illustrate, generally I am in a calm state. My excitement grows when I am energized. However, the amount of excitement that I can experience (or the amount of “energy steps I can climb” in excitement) is pre-determined. Particles that follow the quantization rule and “climb” a specific number of energy steps are called ‘quantum particles.’ Most of quantum particles have spin. A quantum particle can be on certain energy steps depending on its spin’s orientation. An electron, for an example, has spin ½ and can be on energy steps expressed in numbers -½ (down spin) or +½ (up spin). The electron switches between -½ and +½ energy steps when it absorbs or emits a quantum of energy. Other quantum particles have different values of spins which is multiples of integer (0, 1, 2 …) or half integer number (½, ⅜…). For another example, a photon has spin number 1. Quantum mechanics is the academic field that studies how these quantum particles or quantum states behave, as well as the rules or the aforementioned quantization.
Do you remember how I introduced myself as a very small magnet at the beginning? The type of the magnet changes depending on the step I live in. The most basic physical step is when I am in the ‘Spin ½ state.” As I mentioned above, I can go to just two different steps. I will explain a little more about these steps in the next piece.

Superposition: I can Simultaneously Exist during the Day and at Night.

Have you ever thought about a world in which both day and night exist at the same time? In Magritte’s “The Empire of Light”, the presence of light that makes the day bright exists at the same time with the absence of light, which makes the night dark. This situation also exists in the quantum world because different states of quantum properties can exist simultaneously.
Let us assume the ‘spin ½ state’, from which I can only move into two different steps which are -½ (down spin) or +½ (up spin). Similar to how both daytime and nighttime are portrayed in the same piece, I can simultaneously exist in two different states.
Please don’t get me wrong! I am not referring to an ambiguous state, like a sunset that occurs between day and night. I am saying that two different states can exist simultaneously while maintaining separate states, due to quantization. This is hard to imagine because it is a fundamental difference between the quantum world and the “real world”. When it is difficult to grasp, think of Magritte’s painting that portrays day and night as separate but together. Expressed in terms of probability, 50% of myself is in one state while the other 50% simultaneously exists in another state. This is the ‘superposition’ property of quantum mechanics.

Entanglement: The Other One can be Figured out by Reading the First One.

In Magritte’s “The Human Condition 2”, we cannot distinguish between the landscape and the painting. It is unclear whether or not the landscape is being seen through a hole, or if the entire image is part of the painting. The ocean and the canvas are far apart from one another, but the horizontal line makes it seem as if two separate spaces are connected.
If there were crashing waves on the ocean in the canvas, we would expect there to be crashing waves on the ocean outside as well, without actually going outside to check. In a quantum world, such a closely connected state is called “entanglement.”
Let us assume that I am entangled with another spin. Being entangled is the same as sharing information between friends. Therefore, by becoming aware of my state, one could figure out the state of the spin that I am entangled with.
In this case, something very subtle happens. Even if my friend and I are on the opposite ends of the universe, knowing my state would immediately expose the information that my friend has. This phenomenon is comparable to how we view Magritte’s painting. By viewing one side of the painting, we can immediately decipher the other. Don't you think this is marvelous? In the “real world,” it would take an extremely long time to find information from the opposite end of the universe.
Due to these properties, the spin can be very useful. Spin, as it is like a very small magnet, can be used as an information storage, in the same way that computers store information using digits 0 and 1. However, since information is shared when spins are entangled, it is possible to create communication systems or computers that are extremely quick. These are found in technologies such as quantum cryptography, quantum computers, and quantum transmission.

It is Possible to Change with my Environment!

I will tell you more about how I live as a spin in the quantum world. In Magritte’s “The Hesitation Waltz”, there are apples wearing masks. Apples wearing masks! As I tell you, these apples may look like people’s faces. It conveys the idea that apples are feeling serious even when they do not have eyes, noses, or mouth. Just placing masks on the apples makes them appear different from normal apples.
This is because we also consider the surrounding environment when we judge a certain subject. If there were no masks, apples would seem like normal apples on a table. Ultimately, the effect of the masks on the apples made the apples have a different impression on the audience.
It is the same for spin. I can stay alone, but I also interact with the environment surrounding me. Therefore, my property sometimes changes when the environment changes. If the type of the surface I am on changes I can adopt a new and different magnetic property. Similar if I get closer to another spin, our spinning motion is coupled like dancers waltzing together. In this case, our spin properties such as our energy steps change too. However, I return to my original state when I move away from that environment. Despite existing alone, the quantum mechanical environment around me influences me.

Everyday Life Created by Spin

Magritte’s work makes us think about new and unfamiliar things that we rarely encounter in our daily lives. People sometimes discover the other side of reality or face unfamiliar feelings when they see the novel ideas of Magritte, that break away from common sense. It is the same for the quantum mechanical world where I live in. New natural law that people never even imagined of is governing this small world.
The discovery of quantum mechanics was so shocking that it completely changed the existing view of the physical world. Afterwards, it was revealed that there are many more novel properties in addition to discontinuity, superposition and entanglement.
It may seem like a completely different world because it is so small and unfamiliar, but spins are actually closer to people’s life than it seems. Light, any object composed of atoms, smartphones in front of your eyes, and even devices such as quantum computers. People are already doing many things with quantum mechanics, especially by using the value called spin.
Quantum mechanics is no longer something that is shocking or unfamiliar. It is becoming part of everyday life on our planet. Would you like to learn more about the world-changing quantum mechanics and spin?

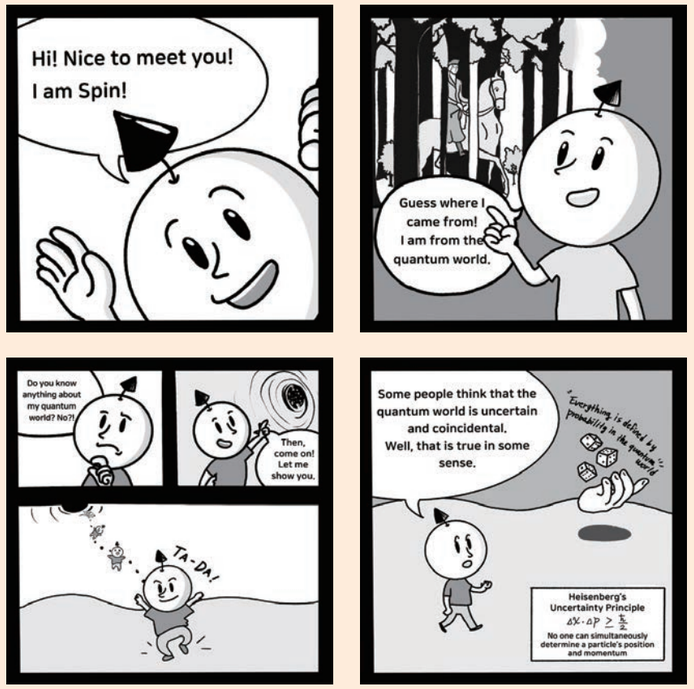
Our Friendly Neighbor, Spin World

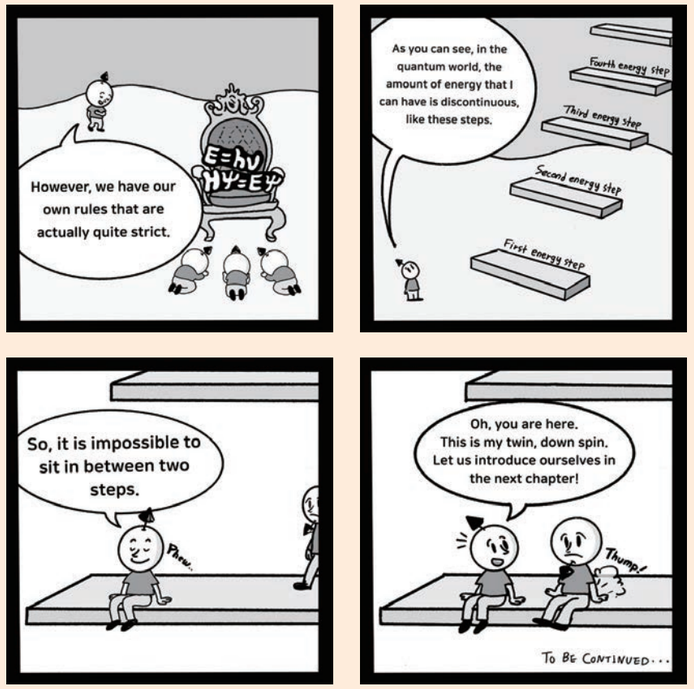
Episode 1

Author
Kyungju Noh
IBS Center for Quantum Nanoscience, Ewha Womans University Doctoral Candidate

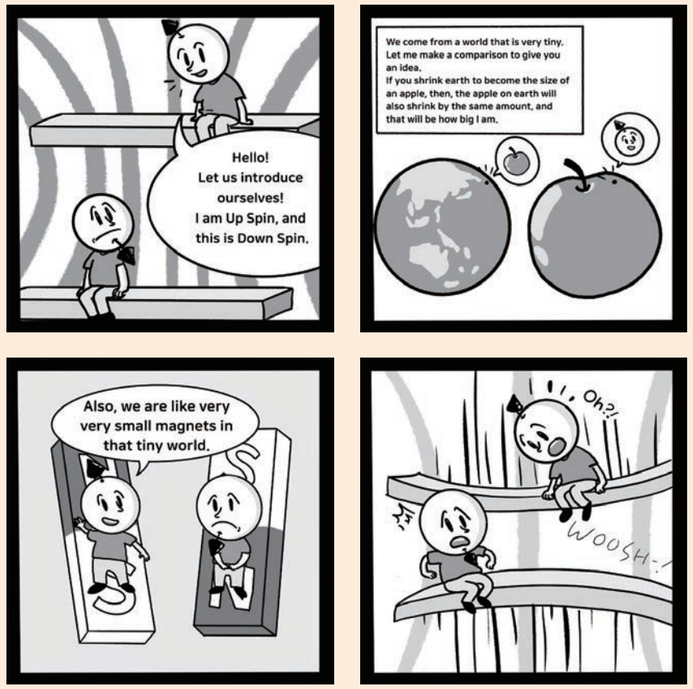
For the participants of the contest, Kyungju Noh created a cute comic introducing the Spin's life in the quantum world. By following Spin's story, the reader can understand how amazing the Spin's world is.

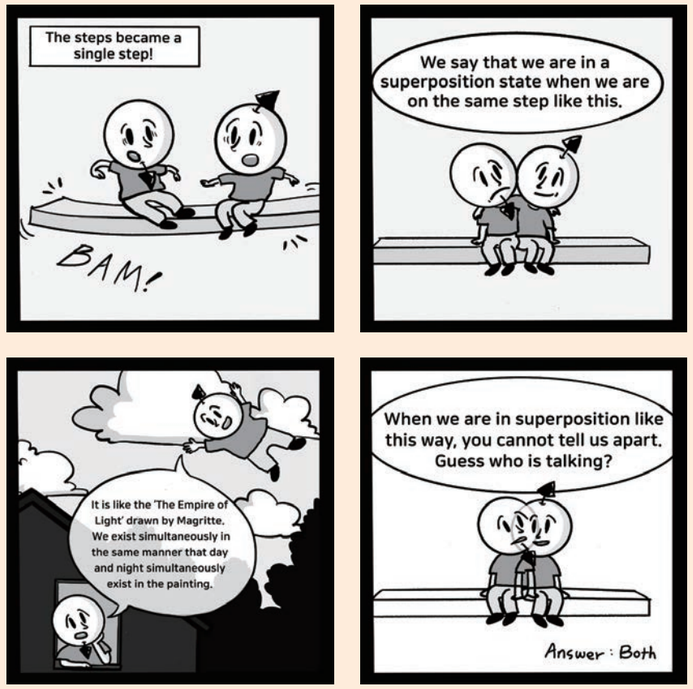
"I hope this comic helps people who were interested in quantum and spin understand them."
- Kyungju Noh





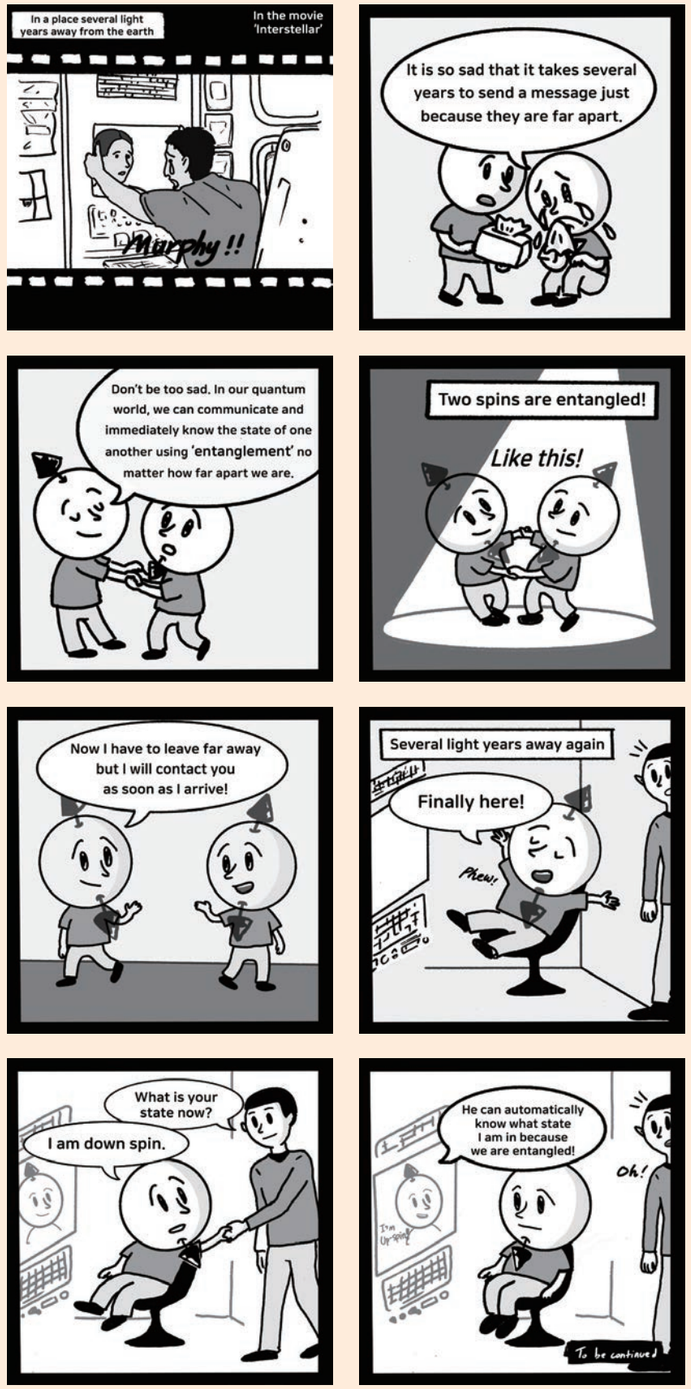
Episode 2





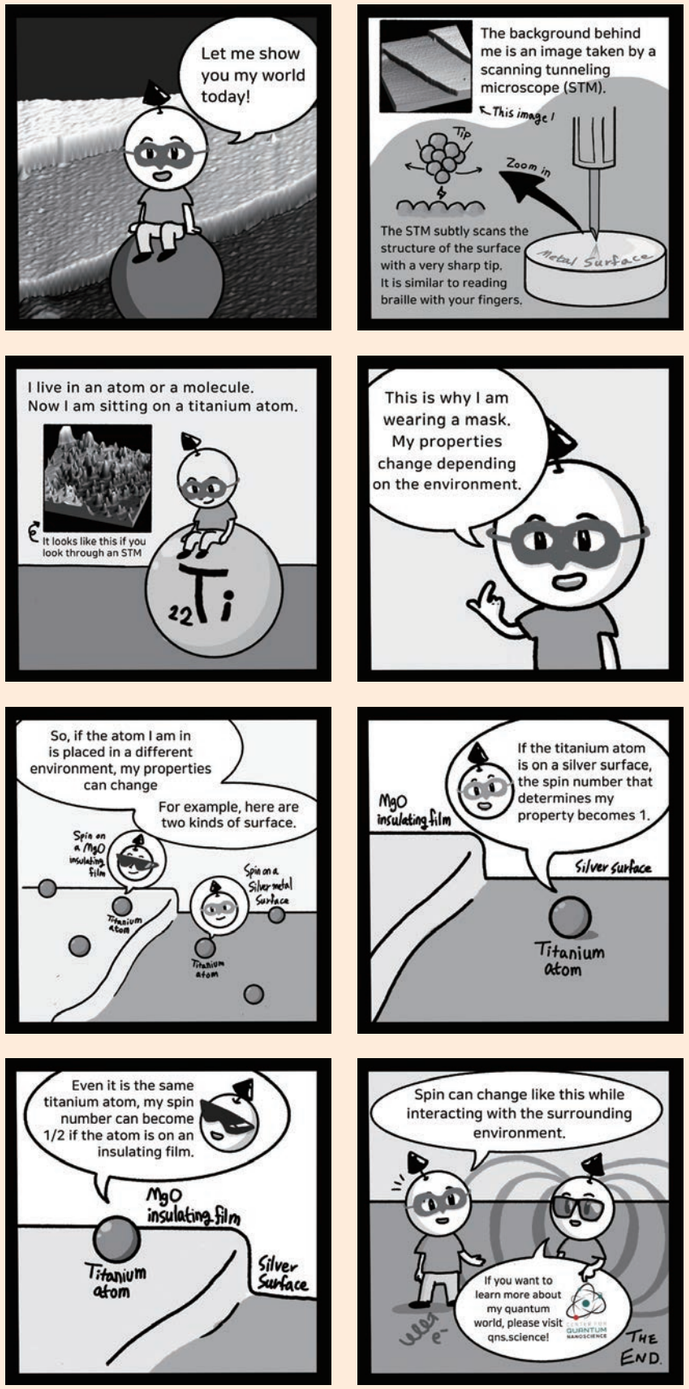
Our Friendly Neighbor,

Episode 3



Spin World

Episode 4



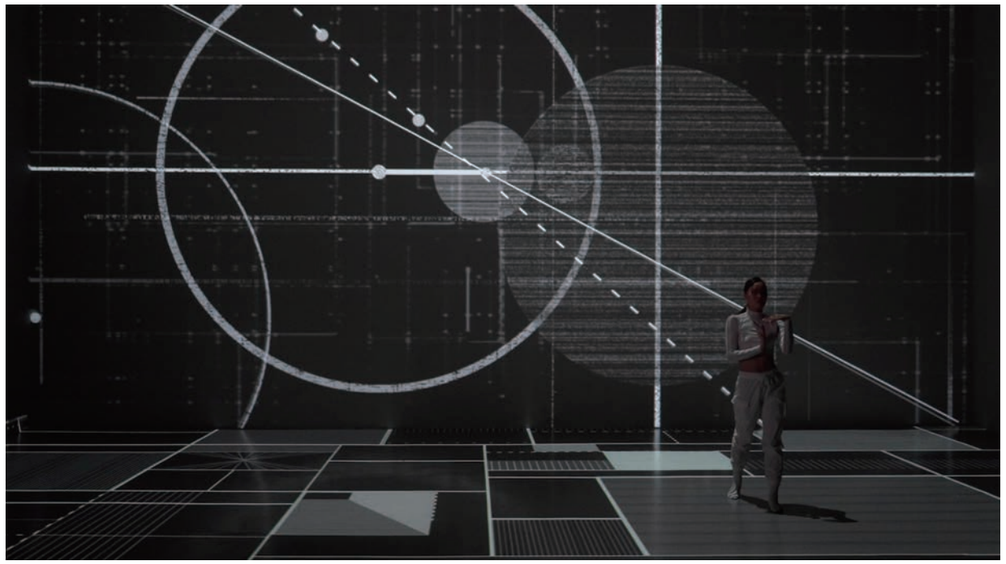
Winners

QNS Director's Prize & Spin Streamer YouTube Prize

Team Moiré
(KIM Jiyeong, JANG Yewon, CHO Yejin, BAE Kyungwoo, JEON Heewon)
Singlet & Multiplet
5 minutes 5 seconds
Performance video
2021

Team Moiré
(KIM Jiyeong, JANG Yewon,
CHO Yejin, BAE Kyungwoo,
JEON Heewon)
Singlet & Multiplet
Video
2021

Scan (click) to watch the video



Artists Statement

There's nought outside and nought within,
For she is inside out and outside in.
Epirrhema ~ Goethe; C.1819

Inspired by Goethe's poem <Epirrhema>, a physicist Wolfgang Pauli discovered the concept of quantum entanglement and quantum superposition. In the world of quantum, multiple quantum states can exist simultaneously until an observer's observation recognizes it as one. We discover the laws of physics through countless observations and experiments. We translate the essence interpreted as phenomena and transform it into concepts to find the essence. Pauli is convinced that law, the external image of essence constructed by the observer, and concept, the internal image, is homogenous. This is because despite the two being different internal images, they are from the same essence.

The same is true for humans composed of numerous atoms. We face multiple internal images throughout our lifetime. We sometimes show an abundance of love towards humanity, and sometimes rage in uncontrollable anger when we experience moral hazards. However, those images are different representations generated by one person, thus, are natural. We all have multiple egos that overlap with one another, and we are beings who leave traces of ourselves in our environment and relationships.

Team Moiré sees an individual's shape as a 'Singlet', and the various identities that exist within it as 'Multiplet'. <Singlet & Multiplet> connects the process of discovering and embracing various aspects of ego with quantum mechanics. Quantum mechanics and ego are aligned in the sense that they both discuss the nature of science and philosophy. They also share common ground on it being imperceivable; quantum mechanics regard the microscopic world, and ego is our invisible, internal self. Team Moiré expresses these characteristics through video using the basic elements of art—points, lines, and planes—and narrates the story through performance.

> *This performance is a masterpiece of pure art expressing the quantum spin in such a stunning way.*
> - Andreas Heinrich (Director, QNS)
>
> *The complexity artists face when attempting to visually express the invisible, intangible and inaudible world of quantum phenomena is immense. The Center for Quantum Nanoscience Spin Art prize demand contestants to show courage to conceptualise and visually express the quantum and nano realm. The winners embodiment of the theme through performance draws from modernist art traditions. The work Singlet & Multiplet expresses an interpretation of spin at the sub molecular that is at the core of being human.*
> - Paul Thomas (Professor, University of New South Wales Art & Design)

Winners

Artists Statement

I would like to pose a question, 'Are you conscious of the reality?' Assuming that I am conscious of this reality, if my space exists here, hence, am I part of the reality? On the contrary, you could also ask, 'Do I not exist?' Following a series of questions consisting of 'if's, I begin to understand space, and that my space starts from a certain reality, which is integrated with other spaces to create a larger space. I, then, pose another question, "Is this reality really my present reality?" And am I real? Numerous philosophers have pondered this question, and each came up with an answer that was reached by oneself.

The above work, that begins with the question of whether we properly perceive our reality, is a sculpture placed in an outdoor environment. It is based on the Penrose triangle and work expresses this in the form of photography. Misrepresentation of physical properties could lead to visual illusions. In other words, something placed in a space must prove whether its form, in itself, is real by having the person perceiving it to recognize its fundamentals. However, we do not know precisely about the perception of the nature of space, and when we enter into it, there is a world that we have even less knowledge about. The two enormous conceptual worlds, which are often divided into the micro-world and the macro-world, have their own individual characteristics. The worlds can be characterized by movement in the micro-world, and great power in the macro-world. I believe that the two worlds resemble one another because they replicate themselves, and the appearances are such that they both seem to be originals, but they are alike in a manner that they are copies of one another, causing us to be deluded. For that reason, a picture was taken of the work as shown above.

KIM Hyungwoo, SONG Junho
Simulacre Triangle
113.0×85.0 cm × 3 EA
Photography
2019

Second Prize

HAN Jaesuk
Things that Flicker
3 minutes 47 seconds
Installation video
2021

Artists Statement

The video *'Things that Flicker'* is a video work created based on the installation work *'Constellation'*. A speaker is usually used as a device that converts the digital audio signal into physical motion. In the work, the speaker exists only as a speaker, in itself, without a digital signal. These speakers operate only in an on-and-off manner in which the power of the connected speaker depends on whether the metal rods installed in the space are in contact with the top and the bottom. Gravity, wind, and pendulum motion, which are 'input values', randomly generate sound and flickering light, which are 'output values', that in turn affect the input values. As a result, it leads to an unpredictable creation and extinction of sound and light, making the exhibition space an infinite realm. This is in contact with the logistic map, which is a function of complex and unpredictable number of organisms in group ecology expressed through a simple order. It is as if one flickering motion of on and off can be compared to the life and death of a living creature.

> *I have rich experience in judging artwork about science.*
> *This contest had a definite high quality in the art perspective.*
> - Cho Sang (Professor, Seoul Institute of the Arts)

Scan (click) to watch the video

Winners

PARK Hari
The Flow
4 minutes 12 seconds
Video
2021

Artists Statement

Everything is a possibility.
Possibilities refer to my present thoughts and how I focus on those thoughts iteratively until they materialize and are placed around me. These iterations may consist of -wave or +wave. The vibrations are constantly attached to the same vibrations (- or +) to sustain one great possibility, and are materialized into reality. That is, an idea has the potential to become something that is already materialized. Here is a quote from a book.

"Quantum refers to possibility rather than substance. In conclusion, both exist in multiple potentials called 'superposition'. As soon as observation or measurement begins, the superposition is revealed as a physical reality (particles), disrupting the wave nature. One of many possibilities will come true. Thus, each moment contains an infinitely feasible future. The reality in front of you is only one of them that you have paid attention to. - Penny Pierce <Sensibility>"

Everything is created 'at this moment'. Our thoughts, actions, and existence only exist in the present moment, and we feel as if we are living with uncertainty, but we have a certain tendency to connect.

In other words, rather than being able to plan everything as we live in a quantum world or all things being in a random form, all plans are fluid, and that fluidity depends on our state of consciousness at the moment.

That is, we live in a world where things that are connected like a chain run freely in uncertainty, and we are constantly observing and perceiving our thoughts and beliefs while turning them into a reality.

Second Prize

Therefore, my current environment and my current reality are simply the result of my choices of the past. No matter how we were born, free will is in our hands right now, at this moment.

To think that there is no free will is also an idea, so, thinking that way will create reality in such a way. I tried to express this flow with several dancers. I tried to capture the flow of perfect improvisation and perfect natural life, who I am as I am, and the principle of uncertainty while respecting them as they are, but with a certain connection. We may not know where we are going, but we believe in the flow of one another because we know that wherever we go, if we flow in a fun and happy way, the result will be completed with the same + frequency range. Our methods were created moment by moment, and the direction of all our thoughts and beliefs were coordinated through each moment.

Our methods were superimposed, encompassing one another, and when we thought about our own future potentials, the same frequencies came together to create a part of this field of art. The vibration was only meant for calling.

I tried to capture this free flow.

I transcended 'I' and encompassed 'we' to contain things that we are 'focusing on'.

This is conveyed in the following statement:

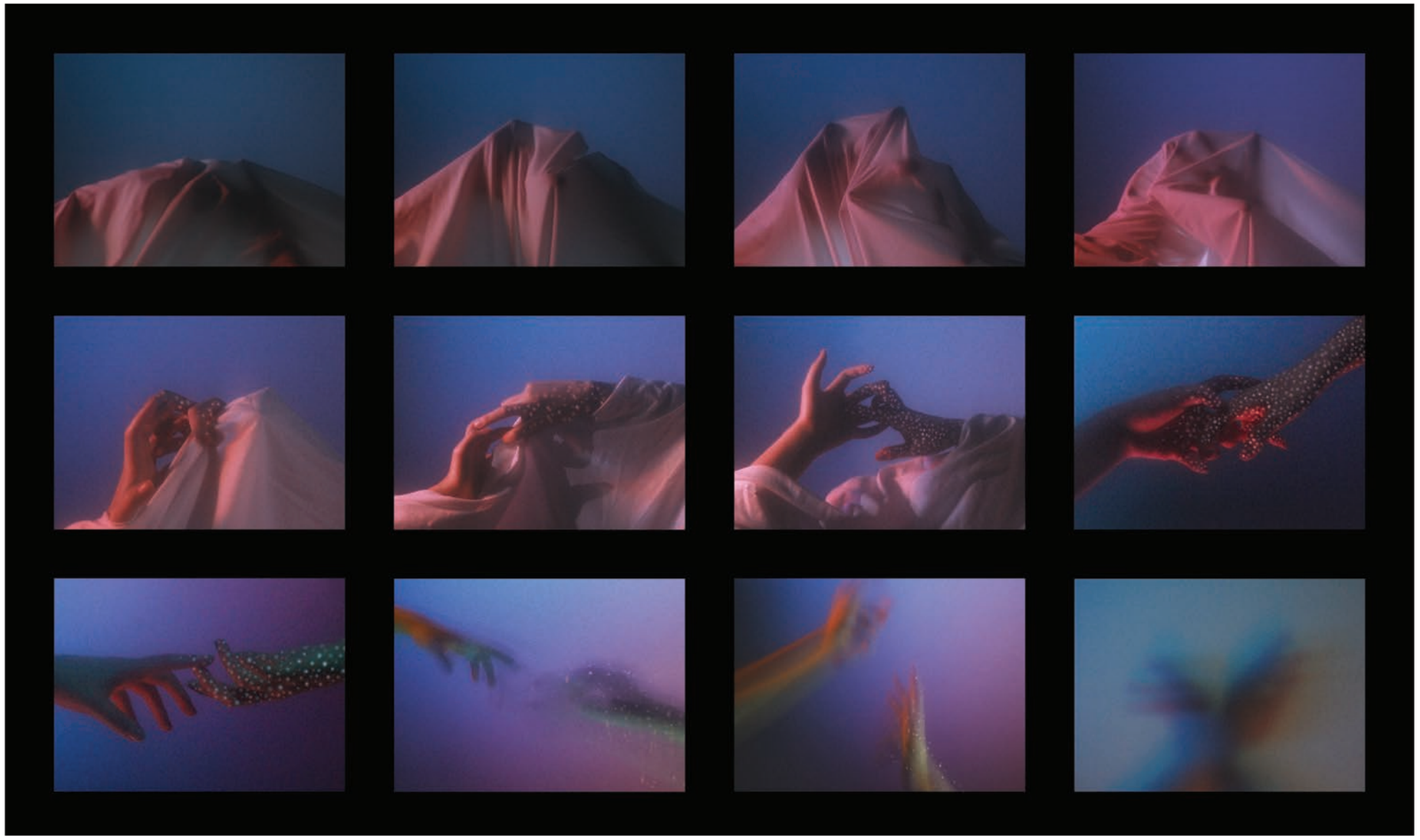
"The laws of physics do not change. We get what we focus on." - Lynn Gravon

> *This contest's media artworks' quality was outstanding. I could tell that the artists observed the subject and express it in their own voice very well.*
> - Alice Woo (Curator, Daejeon Museum of Art)

Scan (click) to watch the video

Winners

Third Prize



KIM Jieun,
JEON Suyeon,
KIM Gabin
Gap
160.0×90.0 cm
Photography
2021

Artists Statement

There are two different spaces that evoke confusion of the self – namely, 'real' and 'virtual' spaces. In the two spaces, 'physical self' and 'self in the media' exist. Humans often act different from their original self in a virtual space where their bodies do not exist, yet they are immersed in the 'different' self, deepening the identity confusion. This 'different' self could be seen as the identity brought about by the expansion of media in the modern society. This shows that the coexistence of the different selves and the confusion of identity as result are inevitable in our modern lives. It is difficult for us to take only one space or self, as we interact with others and exists within countless networks. This means that "self-overlapping" is a common phenomenon for humans living in modern society.

In quantum mechanics, the nature is discontinuous and can be confirmed probabilistic through observation. -For example, when any diagonal polarization of a photon is observed in the direction of vertical polarization and horizontal polarization, probabilistic vertical polarization or horizontal polarization may be obtained.- After all, before measuring the quantum state, several results exist simultaneously in probability, and their existence is unknown before measurement. Therefore, we may be confused as we are uncertain whether our present appearance is the self in real space or the self in virtual space. Various egos are constantly colliding in confusion due to coexistence. In other words, the work <Gap>expresses that the ego changes by the invisible internal energy like the spin motion of quantum and may exist by being selected stochastically in our everyday life.

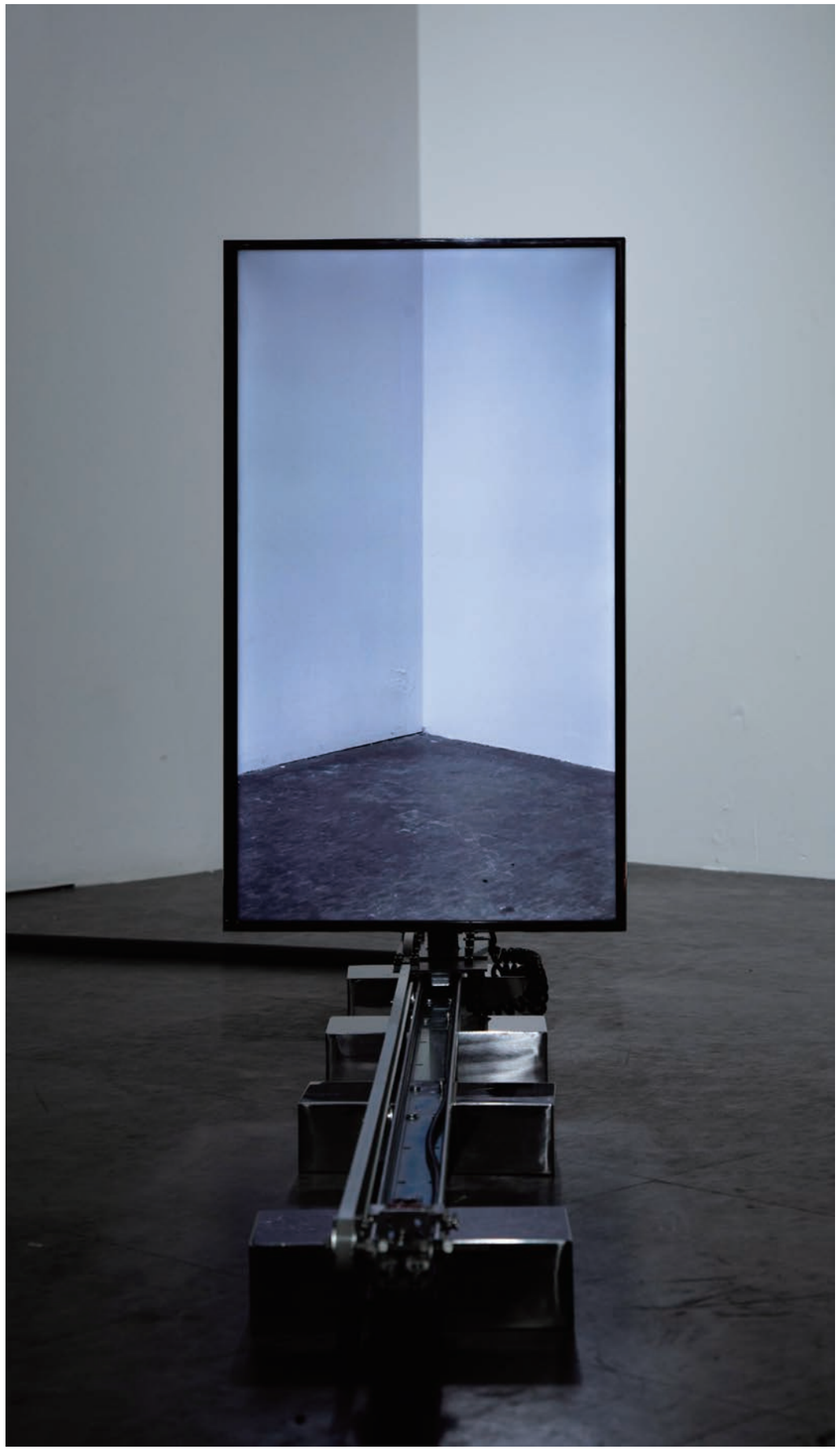
We tried to reinterpret the sensation of 'self-overlapping,' which may be quite common to everyone, from a language of physics to that of art. Hands were chosen as the subject of <Gap>, as they are a medium of human-to-human exchanges and seemed suitable for expressing self-identity. Both hands in a total of 12 images symbolize "physical self" and "self in the media" among various human egos, and are freely exposed to real and virtual spaces. The human figure whose distinction between the two spaces has become ambiguous is projected on both hands to show the state of identity confusion caused by 'self-overlapping'. Point cloud* appearing in the work was used as a device for humans to express their selves in a virtual space assimilated into the media. The two hands, symbolizing self-identity in real-virtual space, are increasingly fluctuating in the fabric, just like the ever-changing and continuous interaction of the quantum world. Soon the hands get tangled and distant from each other and are encroached on the media. Eventually, the two hands meet to leap into the air. The overall flow of the work and the irregular morphological changes in both hands are the key elements of the work.

We produced <Gap> by talking about "self-overlapping" in artistic language. In addition, through overlapping, a characteristic trait of quantum, we tried to ask 'Who am I?" a question on the nature of existence.

* **Point cloud**: a group created by gathering numerous points measured by 3d scanner on the surface of an object. Data held by the point cloud recognizes and identifies objects and defines the structure of the target.

> *Physicists need to know more art.*
> *This contest was a fantastic opportunity.*
> - Juyong Park (Professor, KAIST)

Winners



CHO Haena
Dented Space
2 minutes 52 seconds
Installation Video
2021

Third Prize

Artists Statement

"What orbit do we live in, now?"
I am looking into unrecognizable orbits. Where am I at the moment? It's a question everyone asks themselves at least once. Seoul, South Korea is not a matter of physical location. But it is a social space surrounding me in which I continue to feel uncomfortable—the pressure that comes from an unknown source.
It inquires to see if I am stuck in an invisible circuit of flows, if I settle for the calm status quo.

Dented Space (2021), a physical merger of real and the virtual, is a story of the perceptual chasm manifesting itself in the contrast between what seems, and what is. A 32-inch flat-screen television stands vertically on a 7-foot rail track connecting the two corners of the exhibition space. It remains constant in its operation: a to and fro motion in space. The viewers at first think it is nothing but a moving monitor until they realize it actually plays a video of the room. They would soon be absorbed in its principle. It seems the velocity of the screen is to offset the moving visual images at the moment when the video corresponds to the direction of the video.

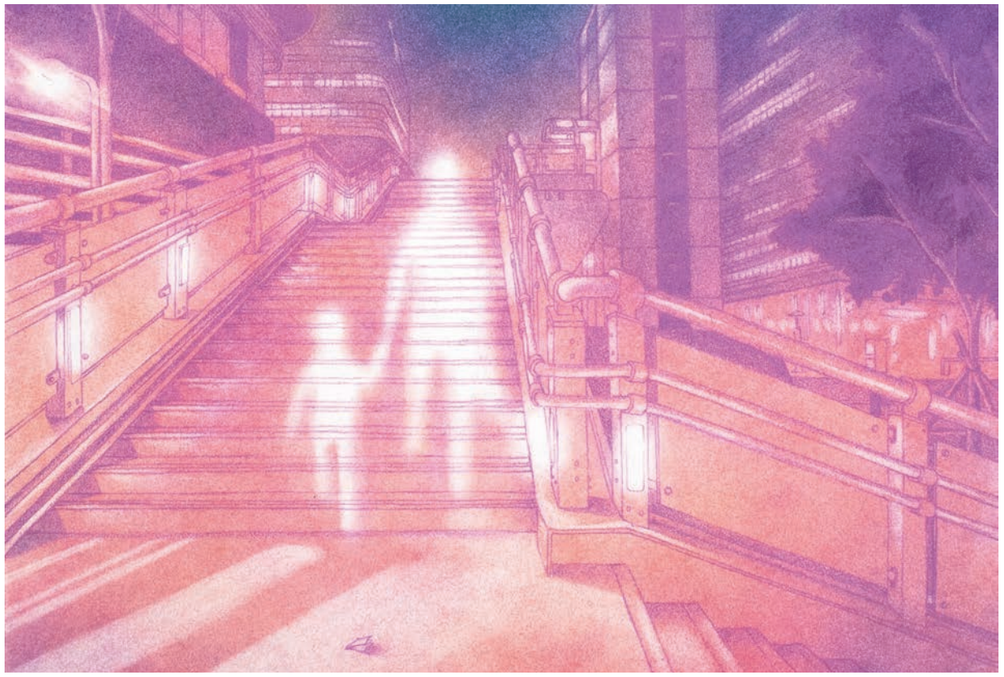
The video turns "the actual exhibition space" into "the virtual one," through the editing process cracking and overlapping the spin, or the total angular momentum. At that very moment, there is a fleeting moment in time when the video and the actual space would be a perfect match, rendering a probability for the viewers to glimpse the entity connecting the physical and the virtual units. The event then leads to cause an optical illusion that crumples the real space. It is reality and fantasy. It is the present and the past. It is to create an overlapping space. And, when the viewers perceive the two expanses, the entity before the eyes transforms into the one existing with the probability. In other words, there are tangled images existing within the physical force, existing between reality and fantasy at the same time.

When an unlimited number of frames overlap, the actual expanse and the virtual one exist at the same time—and so are the present and the past. It means the virtual can be reality; the past can be the present and vice versa.

The principle of Dented Space embodies the spins of quantum mechanics. When and from where the viewers look at the piece determine the artwork's space-time, which is constantly changing. An observer is a primary element explaining quantum mechanics, just as a viewer in an exhibition. Seeing itself is a major determinant of my artwork, and its surroundings continue to alter it.

> *This contest freely broadens the boundaries of artistic experiments by applying scientific logic to them. Especially, many great media artworks captured my attention.*
> - Youngmi Shin (Artist)

Scan (click) to watch the video



Artists Statement

What does it mean to see? Our eyes allow us to observe, and objects to be observed are reflected by light. If seeing is a reflection of light, then, it can be said that we do not see an object but we see light. Then, is everything we see with our eyes light or objects?

All the phenomena of the universe were understood from the human point of view. In the same manner, the old idea that the earth does not rotate and the sun rotates came about because people viewed the world from a human point of view, and the colors shown by light are also named as such because humans designated red and blue. We do not know if the colors are really red or blue. The existence of 'you' and the existence of 'I' are communicated in such a way because we are communicating with the predefined terms. However, it is not possible for us to grasp what is real between 'you' and 'I' with these predefined words because the viewpoints are different. Then what is real? If we were to view things from different perspectives, would there actually be a reality? In the macro world, an object can only be observed when it has a substance. However, there are too many cases in which we may be living in an illusion created by humans.

Everything consists of atoms, and if all the motions of electrons within the composition of atoms were to superimpose, but to appear as one when observed, I would think that we are living in a fantasy created by humans. In addition, if there are electrons that are so small that they are undetectable that move under the influence of light, that would mean that matter moves continuously due to the nature of the electrons while absorbing and emitting light. To see may mean to observe such a state with the eyes. Then, would that not mean that we see matter only as an afterimage caused by light? Could it be that all substances that we see are just afterimages? Are these afterimages real? Can they be accurately identified?
In a state where everything is uncertain, the most certain existence that can be confirmed is 'I'. However, if we think about how we can confirm the existence of 'I', we realize that there is no way to confirm without the subject of comparison. Unless someone is making an observation of 'me', I cannot prove that 'I' am real. In order to make observations and obtain information, they must be influenced by one another. As such, humans observe one another and the world, and humans live their lives believing that the act of observing, in itself, is real. Just because something that we saw an hour ago does not show up after two hours does not necessarily mean that it does not exist. I believe this because I saw it. That belief allows 'me' to exist. Because if you do not believe, "I" cannot prove that "I" am alive.

In the work, 'One day' was set as a series because humans live through the flow of light. Seeing from the point of view of an observer, 'human' makes matter appear as is, and humans who have to be proved by other observers were expressed as an afterimage that is difficult to be confirmed as to whether it is real or not because humans cannot observe themselves. Also, if you look closely at the work, traces of people remain. Traces tell us that there was a movement, so we can guess whether they existed or not.

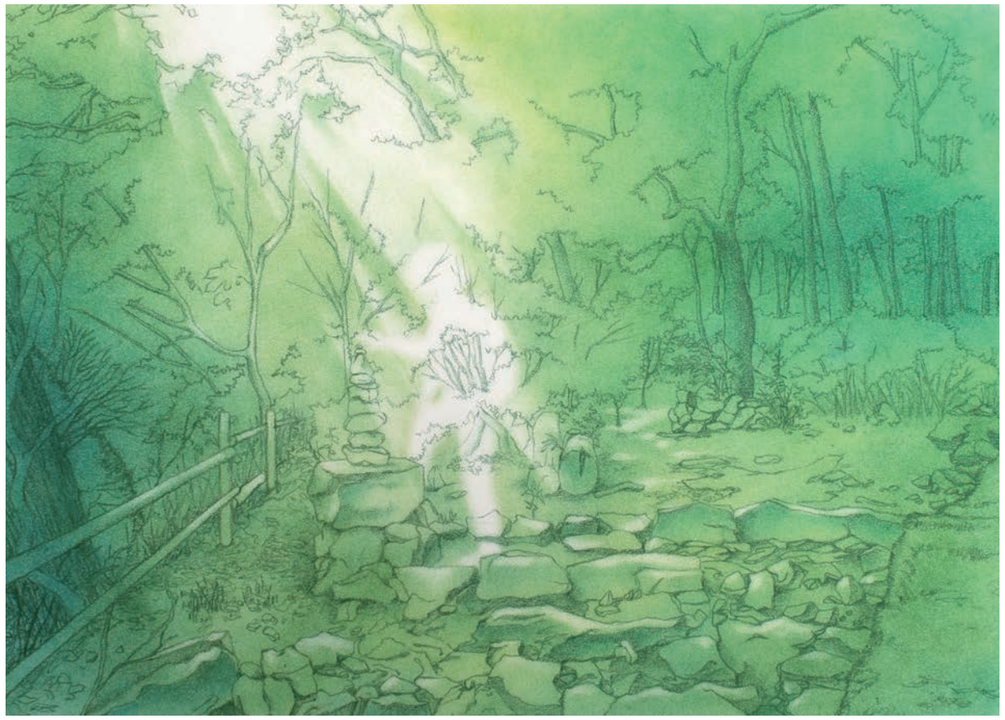
According to quantum mechanics, we live in a world full of questions. Its existence is based on probability in terms of whether it is real or not real. We live in infinite possibilities.

> *This artwork touches my heart. It makes me look back to my warm memories and imagine the infinite possibilities of my future.*
> - Jinkyung Kim (Doctoral Candidate, QNS)

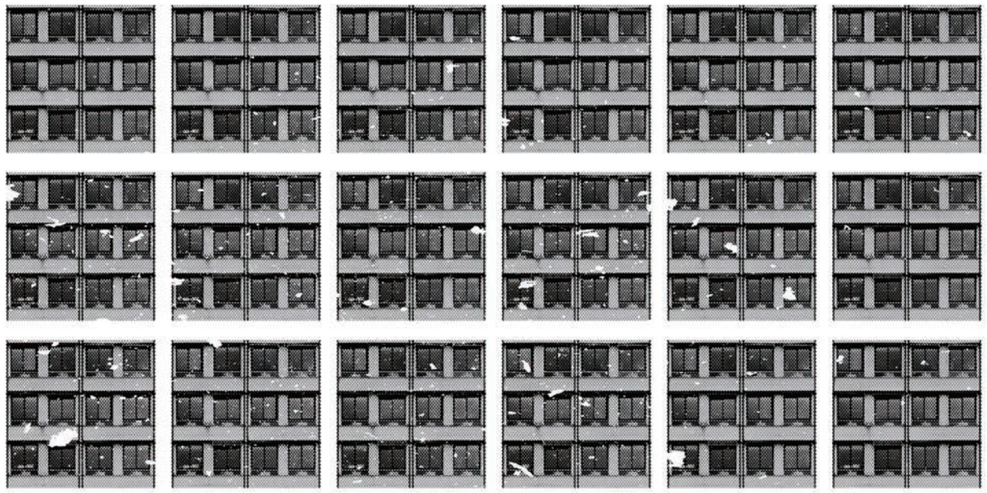
JEONG Jae hui
Day
29.1×21.0 cm × 20 EA
Conté illustration
2021

JEONG Jae hui, *Day,* 29.1×21.0 cm × 20 EA, Conté illustration, 2021

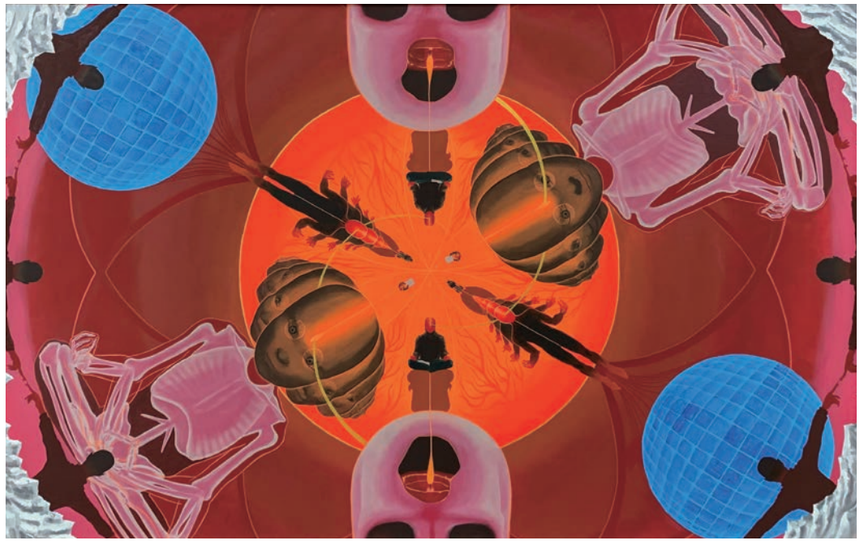
JEONG Jae hui, *Day,* 29.1×21.0 cm × 20 EA, Conté illustration, 2021



Final Round Artwork

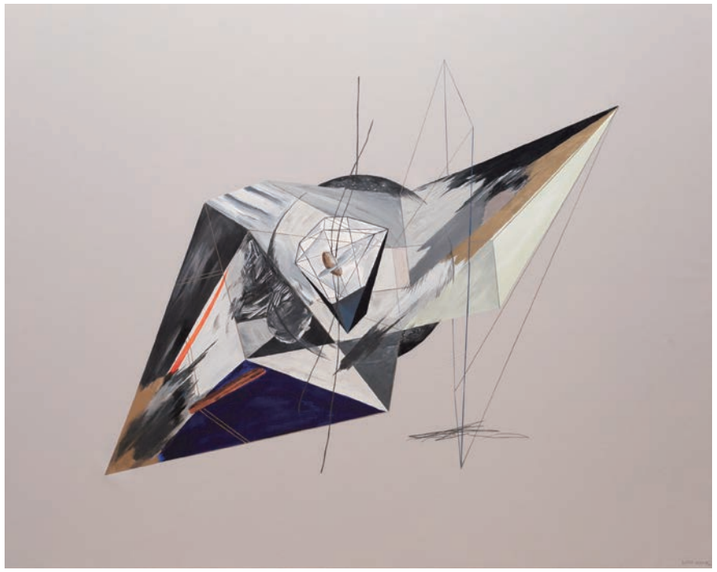


HEO Chang-beom
Dust on the windows
140.0×70.0 cm
Inkjet print and acrylic on canvas
2021

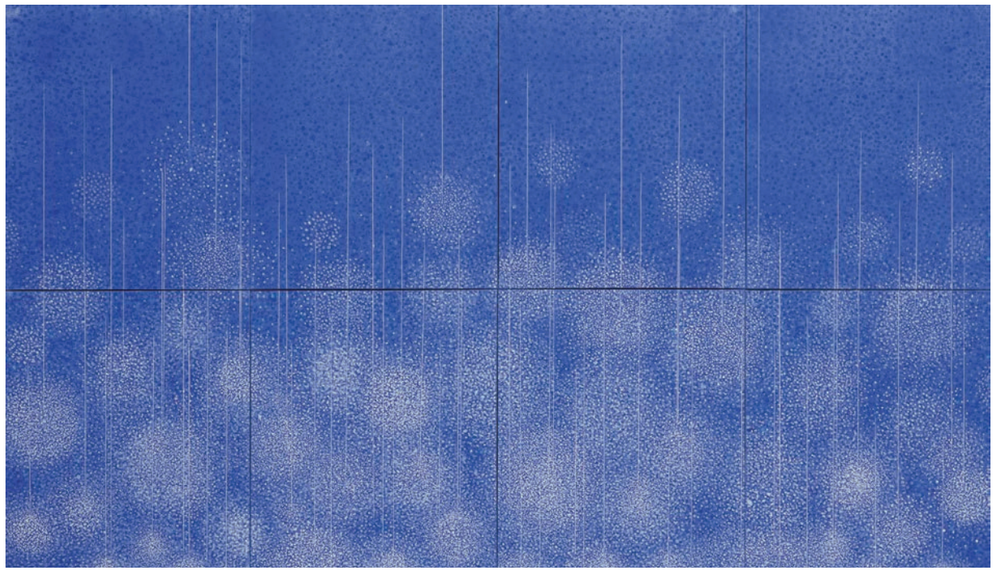


PARK Shin Cheol (Sitch)
Depth (rotate)
116.5×72.5 cm
Acrylic and spray paint on canvas
2021

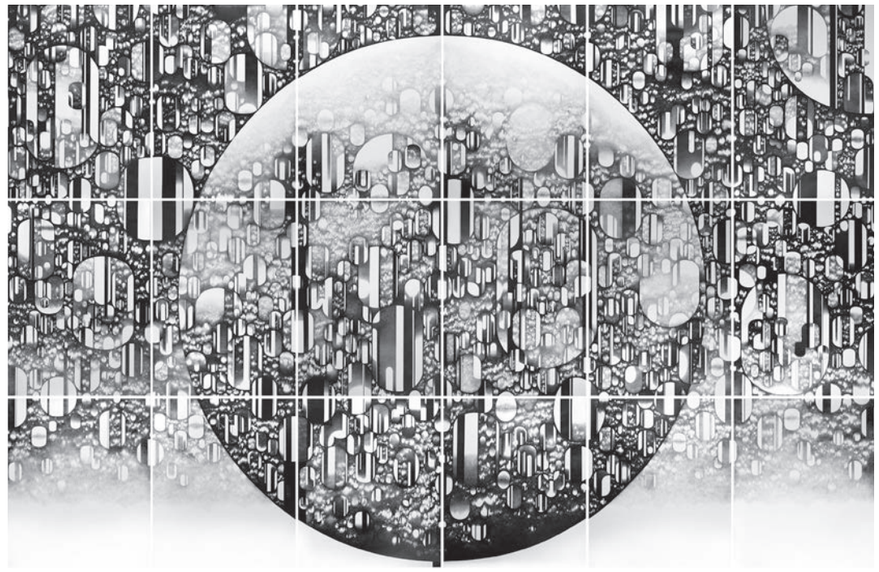
KIM Ju Ryung
When can I See You?
112.0×112.0 cm
Korean paper
2020



LEE Seunn
World of Possibilities
100.0×80.0 cm
Acrylic on canvas
2021

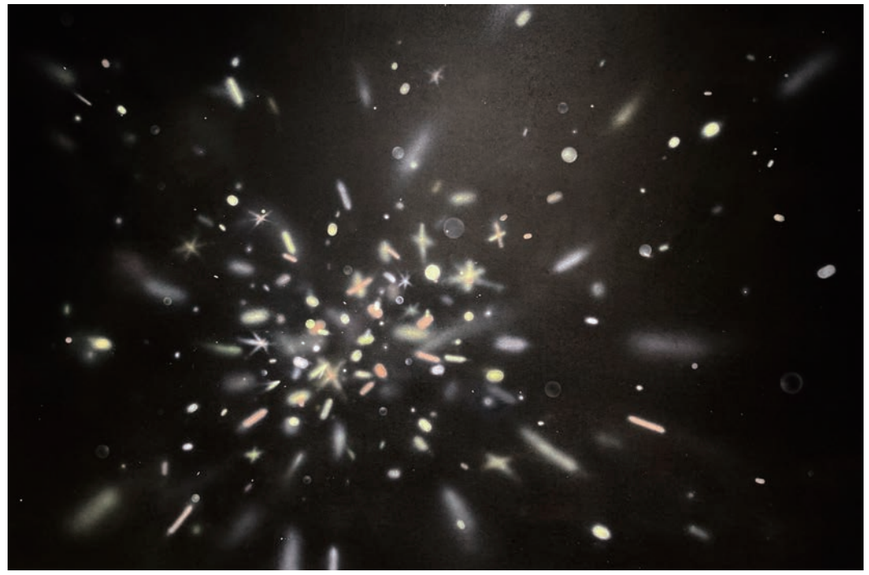


KWON Minjin
The Community of the Light
212.0×67.0 cm
Korean traditional color powders on
Korean paper and sea shell powder
2020



LEE Jung In
The Trace of Memories
215.0×330.0 cm
Ballpoint pen on paper
2020

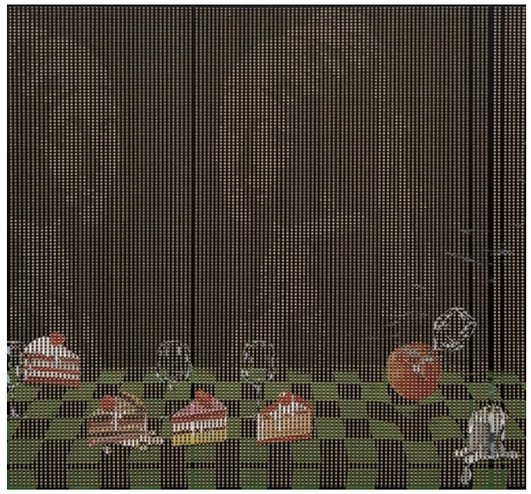
HWANG Soo Hyun
Hide-and-Seek
193.9×112.1 cm
Mixed media on canvas
2014



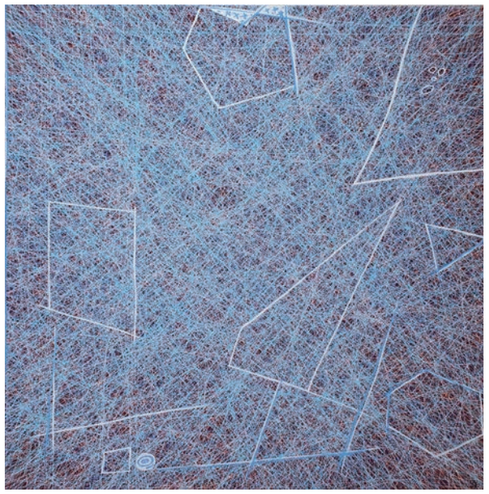
KIM Ko Eun
Disappeared but not yet Gone
145.0×97.0 cm
Mix media on Korean paper
2021

SEMM
KMS.2014.7.21.zip
80.3×80.3 cm
Rust paint and mixed media on canvas
2015

SEMM
Mom and Mom and.zip
130.3×193.9 cm
Rust paint and mixed media on canvas
2016

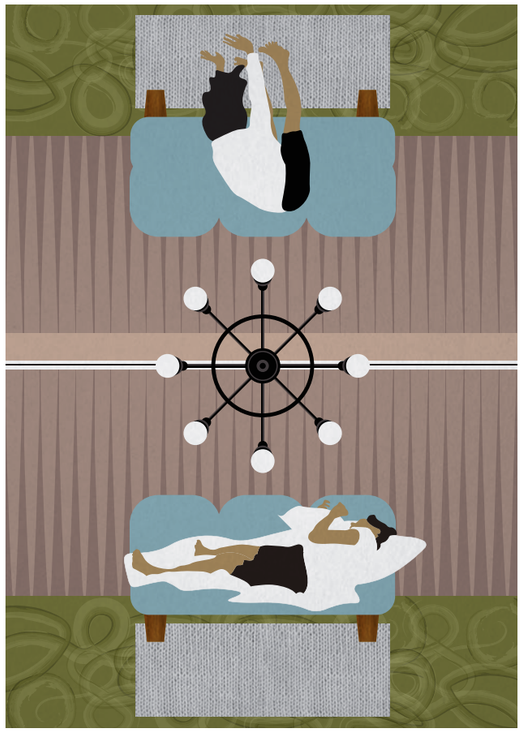


KU Ihn Seong
Hidden Shadow-sweet Invite
97×105 cm
Painting and cutting on the corrugated cardboard imprint
2019



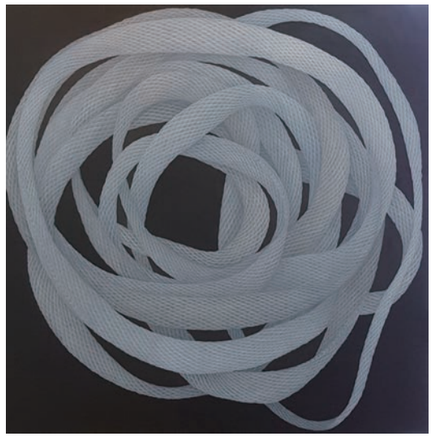
KIM Yoonyoung
From the Smallest World
80.5×80.5 cm
Mixed media (Acrylic and digital printing)
2021

KIM Jung A
Transparent, Strong and Glowing
130.0×163.0 cm × 4 EA
Oil on canvas
2021



JANG Seo Yoon
+ Human image and – human image
45.7×60.9 cm
Digital illustration
2021

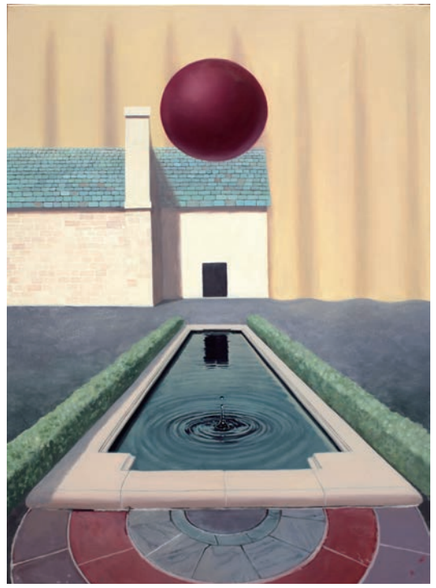
KIM Joon-Hwi
Bootstrappers' Gruppenfest
90.0×90.0 cm
Digital illustration
2021



HYUN Bo-kyung
Relation
91.0×91.0 cm
Oil on canvas
2018

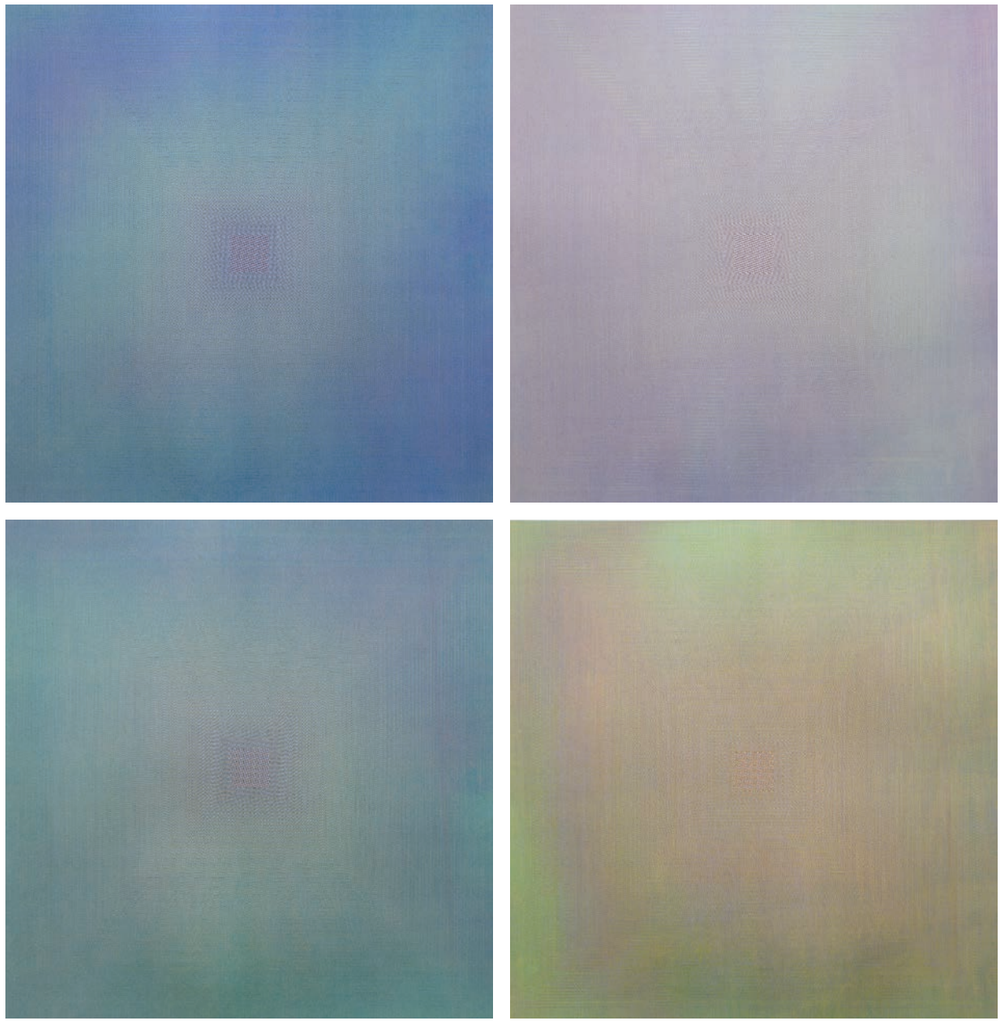
HONG Surim
A Rabbit in the Real Society
116.8×80.3 cm
Oil on canvas
2021

HONG Surim
Perspective
60.6×90.9 cm
Oil on canvas
2021



HONG Surim
Inside
65.1×90.9 cm
Oil on canvas
2021

KIM Ji Su
Still life: Wavicle
117.0×91.0 cm × 4 EA
oil on canvas
2021



CHUNG Ingee
Process Colour
70.0×70.0 cm × 4 EA
Screen printing
2016

CHOI Won Jung, PARK Dan Bi
Vein; an infinite being
72.0×53.0 cm
Korean paper, Sculpey, acrylic, wooden panel, and oil
2021

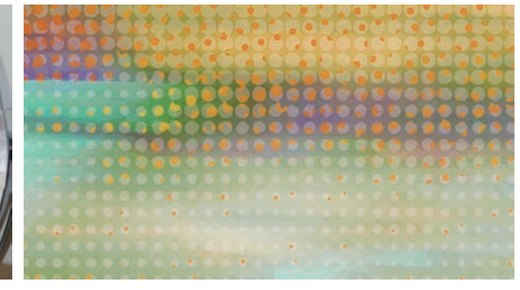
Scan (click) to watch the video

LIM Saemi, BYUN Martin
Into the Passion
72.7×90.9 cm
Video 2 minutes 2 seconds
Canvas, acrylic paint, pendulum art tool, and pouring medium
2021

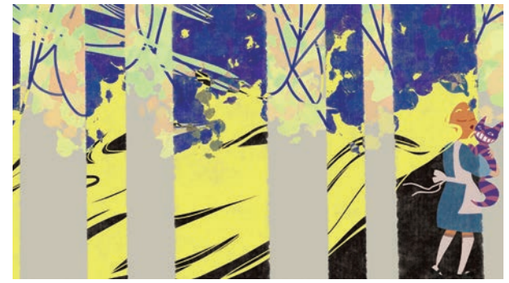
Video

Scan (click) to watch the video

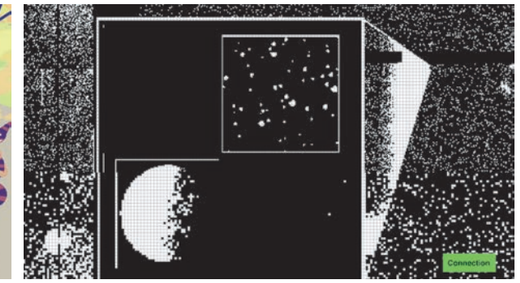
CHOI Hyunjung
Two Mirrors: Will it Really Come to Me?
2 minutes 48 seconds
Video
2016



DANA (SONG Jimin)
The World I live in
1 minute 41 seconds
Video
2021



YOO Poorume
Alice in Spin-land
28 seconds
Video (NFT, digital drawing, and animation)
2021



MIN Ryeojin
Virtual Particles
5 minutes 5 seconds
Video (Digital)
2021

LEE Myung Jun
(Dis)continuous
7 minutes 35 seconds
Video (Sound)
2021