

# Introduction of the 6th Exhibition at the col.lab Gallery

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## ABSTRACT

Tokyo Polytechnic University established the International Research Center for Color Science and Art in 2016. The first exhibition at the col.lab Gallery was held in 2017, and six special exhibitions have been held since then.

This paper describes the philosophy of the gallery, the outline and significance of the 6th special exhibition, and the future outlook of the gallery.

## 1. INTRODUCTION

The research and branding project titled "Create Tomorrow, Learn Future, and Connect the World by Color, KOUGEI Color Science and Art" proposed by Tokyo Polytechnic University (TPU) was selected as a Private University Research Branding Project sponsored by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 2016.

TPU selected color as the research theme and built the International Research Center for Color Science and Art. Color is closely tied to photography, printing, and optics, which have been TPU's focal research fields since its establishment. Research on color conducted by the engineering and arts departments has been paving the way for further integration of technology and art.

At the center, we launched the col.lab Gallery, which features innovative, experience-based learning and uses media arts to introduce the fundamentals of the science of color and the latest research.

## 2. COL.LAB GALLERY AND SPECIAL EXHIBITION

### 2.1 Prior to the Exhibition

When the center was established, we initially planned to hold a permanent exhibition. However, since the project was for TPU's branding, it was important to externally promote the university's activities. There were concerns that the promotional opportunities would be limited if we only ran a permanent exhibition. On the other hand, special exhibitions are periodically promoted before and during the exhibitions. Additional details can be provided by printing flyers, booklets, updating the website, etc.

### 2.2 Color Science and Art Exhibition

The main theme of the exhibition is Color Science & Art. The management committee requested that a faculty member be the director for each exhibition. When proposing a plan, the faculty member has relative freedom as long as it is relevant to his/her background or interests.

As a result, the balance between science and art varies depending on the director. For example, the engineering faculty generally tend to plan a more science-based exhibition.

Because of the variation in the exhibitions, visitors were able to consider the concept of color from various perspectives.

It is essentially impossible to evenly split the science and art elements, so one element may be more prominent depending on the director, but the uniqueness of the gallery is that the two always coexist.

### 2.3 Col.lab Gallery after the Private University Research Branding Project

Since the Private University Research Branding Project ended in 2019, the International Research Center for Color Science and Art reaffirmed its role as a research institution with the objectives of integrating science and art and promoting color research.

While branding-related activities have relatively decreased, the role of the gallery has expanded to present research findings in accordance with the purpose of this center. A research presentation space, the Color Research Lab (CRL), opened along with the 6<sup>th</sup> special exhibition. The CRL space is planned to be open once a year, while the special exhibition is held twice a year.

## 3. 6TH SPECIAL EXHIBITION

This chapter describes the purpose and details of the 6th exhibition planned by the authors.

### 3.1 Exhibition Theme

The exhibition, entitled "When light overlaps, new colors are created," centers around the theme of light interference.

Light is an electromagnetic wave (or particle). When the crests of light waves overlap, they strengthen each other and brightness increases. On the contrary, when the crests and troughs overlap, they weaken each other and brightness decreases (Fig.1). This phenomenon is called interference [3].

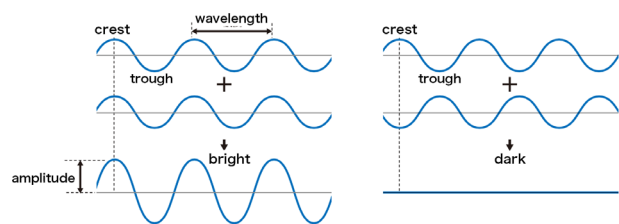


Fig.1 Mechanism of light interference

The special exhibition features the works of four artists who utilize and portray light interference from various perspectives. The mechanisms are explained in written explanations accompanying the works.

### 3.2 Christopher Marley

The work shown in Fig. 2 uses morpho butterflies to demonstrate how structural color causes the appearance changes depending on the viewing angle.



Fig.2 "LIMITED CERULEAN GENESIS"  
by Christopher Marley

### 3.3 Chris Wood

The medium that Chris Wood explores is light. She uses a variety of high- and low-tech optical materials to create light patterns.

Her work uses dichroic film, which transmits light in a specific wavelength region and reflects the remaining region by using the principle of light interference (Fig.3).

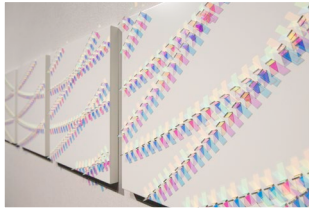


Fig.3 "Interference" by Chris Wood

### 3.4 Mafumi Hishida

The video work entitled "Flux" uses the interference colors in the polarization of liquid crystals, which is an intermediate state between liquid and crystal. When the liquid crystal with a special microscope, a bright color can be seen due to the polarization of light (Fig.4).

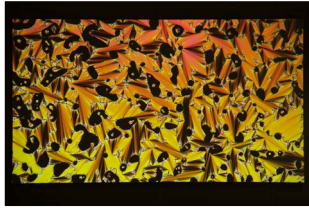


Fig.4 "Flux" by Mafumi Hishida

"At the Moment" demonstrates structural color through the formation of a soft structure in water using the liquid crystal

### 3.5 Toshihiro Hiejima

Structural color is the reflection of a specific wavelength due to light interference, diffraction, refraction, etc. A Chladni figure is a geometric pattern generated by sound interference. In Hiejima's featured work, he created a sound image of Chladni figures using structural color pigments (Fig.5).



Fig.5 "The Sound Image by Interference"  
by Toshihiro Hiejima

The authors provided suggestions on how to exhibit the

work as an art piece; thus, it can be said that this work has a great significance as a result of the fusion of science and art.

### 3.6 Color Research Lab

The CRL was established in 2020 to display presentations on color research (Fig.6). Since the concept of the CRL differs from the special exhibition, the exhibition space was sectioned off. The CRL is essentially a poster exhibition displaying research alongside exhibited works to introduce color research in a visually appealing way.



Fig.6 Color Research Lab.

### 3.7 Exhibition Space Plan

To maximize space, rather than dividing the special exhibition into small sections with walls, the works were displayed in one cohesive space, making it possible to see the works of different artists at the same time. Although the works all center around the principle of light interference, each work contains a different perspective and amplifies the phenomenon in different ways. This enables visitors to compare the differences in how artists portray light.

The CRL typically displays research presentations, we designed the space to resemble a passage so that visitors can view the panels thoroughly.

As a countermeasure against COVID-19, we reduced the number of hands-on displays as much as possible and selected works that do not require touching.

## 4. CONCLUSION

The exhibition focused on the natural phenomenon of light interference and featured the works of artists that expanded the aesthetic properties of light interference.

The exhibition successfully launched after postponement due to COVID-19. On the other hand, to prevent spreading, drawing in visitors has not been prioritized, so the number of visitors remains low.

However, we hope that the content of the exhibition will be archived as booklets and on the website after the exhibition for future reference, so that the philosophy of this gallery can be clearly communicated to others. We believe that it is the social role of this center as a research institution to further the gallery from a medium- to long-term perspective, regardless of the number of visitors.

## 5. REFERENCES

- [1] K. Jo, The Mechanism of Color, SHINSEI Publishing, 2009.
- [2] Newton Press, The Science of Light and Color, Newton Press, 2015.
- [3] <https://www.japansensor.co.jp/faq/969/index.html> (2020)