introduction

My collaboration project is about the integration between science and art throughout astronomy. Collaborators are Anastasia Kokori and Angelos Tsiarasin who are astronomers researching astronomical objects particularly exoplanets at the Royal Observatory and University College London.

Anastasia Kokori - Project Manager

Anastasia is the Astrographic Officer and an Observatory Explainer at Greenwich Royal Observatory in London. She is a graduate of the Space Studies Program (SSP) 2018, organised by the International Space University (ISU), and also holds an MSc in Science Communication from Dublin City University (DCU), and a Primary Education Degree from the Aristotle University of Thessaloniki. She is also, a Journalist and an amateur Astronomer, and has experience in organising projects that involve the public and school students. She also has a long experience in working at the Mt. Holomon observatory, where she conducted her undergraduate thesis.

Angelos Tsiaras - Science Manager

Angelos is a Post-doctoral resereacher at UCL (University College London) in London. He is a Physicist graduated from the Aristotle University of Thessaloniki and has a PhD in Astronomy from UCL. As an expert in data analysis, both with ground-based and spaced-based telescopes, he is the main developer of the scientific tools used in the project and has a long experience in working at the Mt. Holomon observatory, where he conducted his undergraduate thesis.

https://exoworldsspies.com/people/

The human understanding of life/object in the universe is one of the developing subjects in science. We believe the development of this area intimates the development of the human understanding of life origin. We explored the potential of growth by the integration of artist and scientist's viewpoint on this genre.

I divided this writing into 4 parts that abstract of our project, process1, process2, and feedback and outcome. Let's start with the first section abstract of the project.

abstract

The title of our project is Experiencing the mysterious nature of exoplanets through painting. A formal abstract for the project is the attachment below:

Abstract

Most people may think art and science are incompatible. However, we believe that originally, they share a common root: creativity and curiosity for understanding the Universe. Science collects observations and uses reasoning and data analysis to construct a realistic image of the cosmos. On the other hand, Arts is inspired by experiencing the world and depicts an enhanced version of reality. In order to explore how science and arts can contribute to each other, we started an effort of bringing together astronomical concepts/ objects and their representation/interpretation through paintings. Our project is the challenge for creating a new perception of the universe for the future by turning back to the essential baseline/ foundation of science and art. We present here the result of the co-operation between arts and astronomy. In our project an important element is combining accurate scientific information with the artist's imagination and perspective. Different paintings of astronomical bodies will be demonstrated as an outcome of this effort, but the main topic that we focus on is the field of exoplanets which is currently growing to a great extent.

There have been discovered more than 3900 exoplanets which is already a revolutionary knowledge for understanding our position in the universe. Despite this knowledge, we do not much about the nature of these planets. How do they look like? What's their weather?

This is where art can play a very significant role; visualizing these exotic bodies and provide an alternative perspective. Our project can be used as case for other collaborations between scientists and artists, help science to evolve and finally contribute to the general exploration of the cosmos and our origins.

Figure 1: A 15 x 15 cm oil on board painting of the lava planet 55 Cancri e by Mai Wada.

To sum up, our project challenged the visualization of the invisible planet exoplanet/55cancri e as an artwork by combining accurate scientific information with the artist's perspective. The uniqueness of our project is that we attempted to add the aesthetic aspect in the visual expression of an exoplanet by accepting paint instead of the digital program. We expected art depicts something more than scientific accuracy.

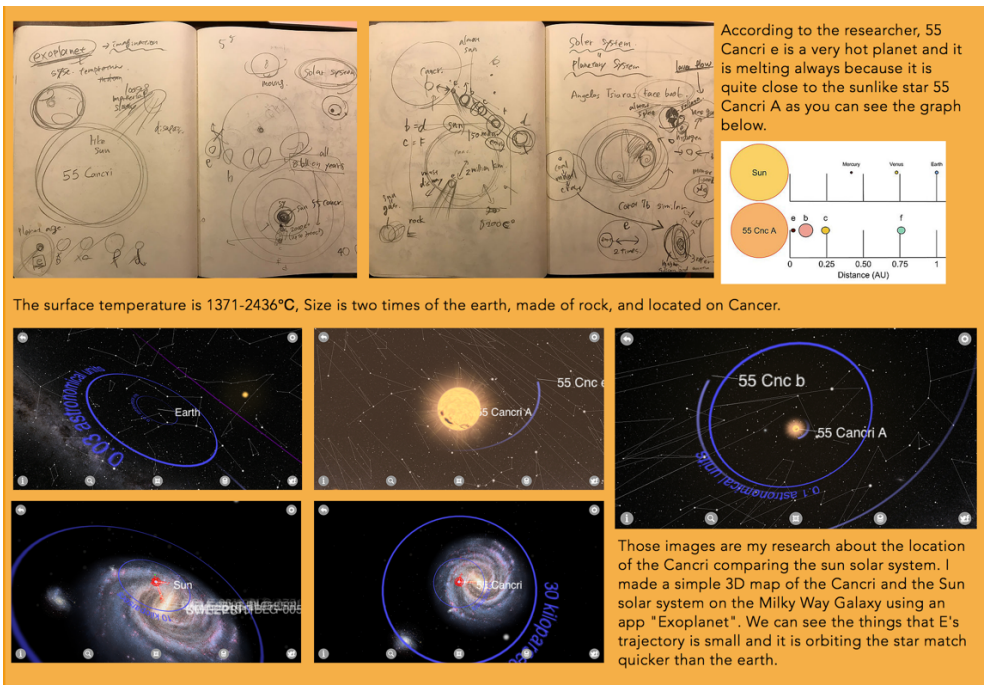
process1

process 1 is a scientific approach to understand what the 55cancri e is. The scientific approach means collecting and analysing data which is observed or proved by science as a fact.

I assembled basic knowledge of e while repeating the process of reading books or articles and verified the legitimacy by the communication with the above collaborators. This approach shaped out my initial image of e.

However, the problem was even astronomers don't have much accurate information about exoplanets. Collaborators stated as a reality, astronomers are doing very indirect research, it can identify the location and approximate size, but the other data is just a prediction from the past observation of the near solar system because they haven't visually observed exoplanets.

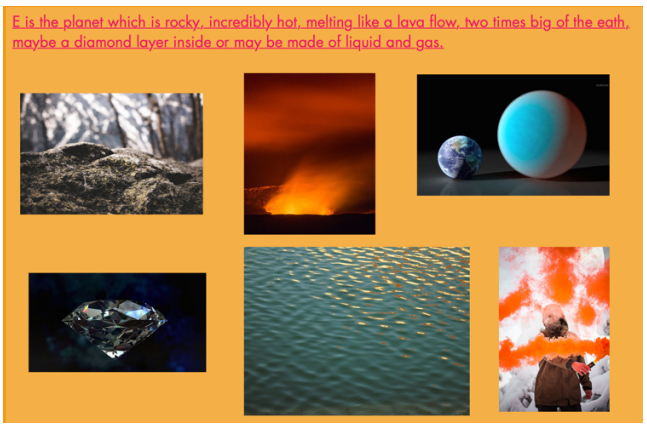
As selected reliable information, the size is almost double of the earth, the material is rocks, it is orbiting quite close to the sun, the surface temperature is nearly 5000 degree, the surface rock is melting the same as lava flow, the lave on the planet is repeating dissolution and coagulation by each 18 hours rotation. The planet is gradually evaporating because of the close sun. Astronomers predict e will disappear in a few billion years. Additionally, e is popular as a planet might have a diamond layer inside because of the material and pressure, but it is not proved by scientists yet.



A piece of my research paper

The characteristics of e I found is:

e is a planet which is rocky, incredibly hot, has a melting l lava flow, two times the size of the earth, could have a diamond layer is inside, and will disappear within a few billion years.



The mood board of 55 cancri e I made through process1

An image drawing of e

<u>process2</u>

Now we move on to process 2 an artistic approach to paint.

In the process 2, I aimed at creating an embodied image of e from experiences with my five senses because I wanted to make a painting letting someone feel reality. I believe the reality of paintings come from the personal experience of the artist, I researched some common objects between the earth and e. For example, watching, touching, drawing actual rocks, lava stones, diamonds, minerals, and so on.

As selected useful experiences, touching lava stones supported my imagination of the melting surface and the texture.

Varied minerals in the Natural history museum allowed me to imagine the smell.

A moon drawing in the Natural science museum made me feel the direct impression of the rocky planet watch through a telescope.

Listening to the sounds of planets from NASA projects let me think of the sound of e.

(https://www.nasa.gov/vision/universe/features/halloween_sounds.html)

Moon drawing at Science History Museum

Minerals in Natural History Museum

4 types of lava stones in Natural History Museum

By connecting the scientific knowledge to my experience, I developed the image of e more and more realistically. Finally, bringing inspirations and scientific data together, I depicted e.

Drawings throughout process 1 and 2

55 cancri e,15 x 15, oil on board

Feedback and Outcome

From the feedback of the project, I found the significance of linking science and art. An astronaut Mae Jemison (2002) defined the relationship between art and science like the front and back of a coin. What we found through the project is science and art share the same origin as the human curiosity for the world/universe. The difference is science explores the origin of the world and life by analysing evidence, on the other hand, art demonstrates it throughout more personal experience and inspiration. Our common opinion is, if we stopped separating artistic and scientific factors and build the understanding of the world by cooperation, we will see a brand-new

interpretation of the world/universe. As our first formal approach to integrate art and science, we applied to an international science conference EPSC(European Planetary Science Congress) to publish our collaboration project.

EPSC 2018, https://medium.com/innovating-innovation/recent-epsc-events-on-innovation-5b05a8993e5f

From my personal feedback, I recognized science is a huge inspiration source for painting. If I didn't meet with my collaborators, I won't have an idea of painting exoplanet. By comprehending what science trying to do now, my creativity is inspired and broaden. The process of visualizing e was exciting because I could learn scientific ideas and factor for the universe. It was an impressionable experience which knowledge directly becomes a painterly image. I think this project is successful because I challenged a new subject by collaboration and as a result, we built up a strong concept as enough to apply to the international conference. On the other hand, I felt the final painting is uncreative. Even though the painting was accurate and a bit more beautiful than CG images, it doesn’t beyond the visualization of scientific evidence. I could state the painting was one of the belongings of science. After the project, I started to think about how my creativity leads scientific knowledge, it is a subject of my new project.

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